



INSIDE DOPE

by **GEORGE F. TAUBENECK**

Story of the Week
'Your Creative Power'
You, Too, Etc.
It's Easier to Criticize
Than to Create
Sheriff Schellenberg
He's On the Ball

Story of the Week

Three days after a curvaceous young widow took up residence in a new neighborhood, she beckoned to a boy playing in front of her home.

"I need a few things from the A. & P. store, and I can't get away just now to go," she told the lad. "Could you go for me?"

"Fraid not," hesitated Tad, regretfully. "Ma told me to stay right here. My Pa can, though."

"Huh?"

"Sure, lady. Only last night I heard him say, 'Gosh, I could go for that widow any day in the week.'"

'Your Creative Power'

Now and then in this column we sing the praises of a book published by our Conjure House division—which produces only two or three exceptional books a year.

This week we're recommending a truly remarkable book put out by another publisher—Charles Scribner's Sons of New York (a giant Eastern publishing firm). The book's title is "Your Creative Power," and its author is one of the truly great creative men of our times, Alex Osborn.

(Mr. Osborn is THE Osborn of that fabulous advertising agency—Batten, Barton, Durstine, and Osborn.)

"Your Creative Power" is easy to read. Like our own books, "One Foot in the Door," "The Marshal's Baton," and "It's a Great Life," its principles and philosophies are leavened with anecdotes. Osborn, however, doesn't illustrate his points with funny stories. Rather, he cites case histories. How important men made these principles work for them—that's his formula.

You, Too, Etc.

Great thing about Osborn's book is that it assumes the reader is an ordinary sort of guy who hasn't realized his Potential.

Osborn tells him how he can.

We too often give up too easily and too early, he insists. And he quotes a rowing coach's axiom: "If you hang on two strokes longer than your opponents you will lick 'em."

Self-confidence used to be an American virtue, Osborn continues. But fashions have changed. Optimists are laughed at, and eagerness-to-get-ahead is frowned upon. False modesty and individual self-effacement are drilled into young folk today. "Underplaying," the theatricalists call this sort of thing. (Teachers refer to "social consciousness" and "group adjustments").

Thus it has come about that few young Americans stick their necks out any more, lest they be abhorred by "the group." Creative ideation by an individual, it would seem, has become socially unacceptable. To conform is the norm.

Yet, Osborn points out, all progress results from personal innovators who dare to be unconventional.

If you're "normal" and conformative you can't be creative. The Obvious, "the norm," is what inventors and imagineers avoid.

It pays to be different.

Naturally, it often takes a long
(Concluded on Page 6, Column 1)

'Spring Is Here!'

(A guest editorial by J. R. Hertzler)

SPRING is here. We're young again. Young men's fancy is turning to thoughts of love. Since our first love was air conditioning, possibly such an introduction can be pardoned.

Anyway, in the Spring of the year many an executive's vest button is popping as the "corpulent creature" sits back on his swivel chair and reviews all of the sales promotional material, all of the calendared sales activities, and the masses of paper which have been organized in piles little and big to assist in the 1949 sales effort to help more people get comfortable and to help more businesses increase their business at a time when business is sliding off.

You, too, can make money in air conditioning.

You don't have to be a weather prophet to sell air conditioning, but it helps.

You don't have to be established in the business in your community, but it helps.

You don't have to go out to find prospects to buy room air conditioners, but it helps.

You must close orders, deliver, and install room air conditioners, and collect the full amount due you to make money even in air conditioning.

In air conditioning, so we've been told, just as in many other businesses in which specialty selling can play its part, the toughest customer we have to sell is the dealer and his salesmen.

Having come up through the years in the air conditioning business, and having seen it grow into a man-sized business, it is only natural that we should reflect on the quality of air conditioning results produced by a room air conditioner as compared with the results produced by the most intricate and elaborately designed central station system. The room air conditioner today is tangible evidence of what mass production, popularized in so many fields, has been able to do in increasing the purchaser's air conditioning dollar value.

Without branching off into commercials, and without referring to the benefits of completely hermetic systems, five-year guarantees, and other features which are spearheading many a sales campaign, the air conditioning engineer can point with pride to such features as:

- (a) Individually adjustable air diffusing grilles
- (b) Pump-out for evacuating the room of stale air, smoke, and tobacco odors.
- (c) Complete filtration of all air supplied to the room.

There are many central station systems, even of the expensive post-

(Concluded on Page 24)

**Truman Asks Extension,
No Easing of Reg. W**

WASHINGTON, D. C.—President Truman in answer to a direct question at a recent press conference denied that the board of governors of the Federal Reserve System is planning further changes in Regulation W that would further ease consumer credit controls.

The President also stated that he will ask Congress to extend Regulation W.
(Concluded on Page 4, Column 2)

**Baker Hotel Interests
Buy 500 Room Coolers**

SAN ANTONIO, Tex.—Five hundred Carrier 1-ton room air conditioners were purchased by the Baker hotel interests for installation in the Gunter hotel here and the Baker hotel in Mineral Wells, it was disclosed by Joe Thiele, Inc., distributor.

It was believed to be the largest single sale of this type of equipment on record.

He explained that half of each of the two hotels were already air conditioned by a central system and that the room air conditioners will take care of the other half.

At the same time, Thiele reported that two tourist courts had purchased several dozen ½-ton room units.
(Concluded on Page 41, Column 2)

**Theater Cooling
Standards Sought**

MINNEAPOLIS—Widespread disagreement among U. S. motion picture exhibitors over the meaning of air conditioning and what equipment deserves that name was revealed by its recent nationwide survey of theaters, the magazine *Showmen's Trade Review* reports.

As a result of this finding, the trade publication has asked the Society of Motion Picture Engineers to establish a set of standards for theater air conditioning. It has also requested that air conditioning terminology be standardized.

The magazine said there would seem to be abundant opportunity and urgent need for the society to repeat in the field of theater air conditioning "the wonderful work of standardization it has done in projection and sound."

"The air conditioning industry and its engineering societies can't do this because their scope is too broad," commented Aaron Nadell, technical editor.

"Think of an air conditioned Pullman car moving rapidly between extremes of climate, or an air conditioned factory where the goal is not comfort but the best atmosphere for the material being processed. Theater air conditioning remains a special field."
(Concluded on Page 41, Column 2)

**Action Held Up on
Ohio Law To Stop
Utility Selling**

COLUMBUS, Ohio—After hearing opponents of the bill which would prohibit utilities in Ohio from merchandising appliances, the Commerce and Transport Committee of the Ohio House of Representatives postponed further action last Wednesday night pending an investigation with the state attorney-general as to the constitutionality of such a law.

Last week's hearing on house bill No. 435 followed a similar session the preceding week when appliance dealers supporting the bill presented their views before the same committee.

Whether all appliance dealers in Ohio are unanimous in support of this measure is a question. Board of directors of the Electric Dealers Association, Inc. of Columbus, for example, recently voted to take no open action either for or against the bill.
(Concluded on Page 4, Column 3)

**This Issue—A Special
On Air Conditioning**

This is an "air conditioning special" issue of the News. Its purpose is to give a picture of the air conditioning market, and to direct attention to successful sales and application methods for various segments of the market.

Discussions of proper sales approaches to the room air conditioner market by men who have made their mark in the field—Herbert L. Laube and Bernard Mitchell—will be found on pages 34-35 and 38-39. The successful invasion of the theater field with packaged units is described on pages 14 and 15.

How a successful dealer is planning his local newspaper advertising on air conditioners is outlined on page 8. The story of how photographs of installations help a dealer in selling is told on page 12.

A complete breakdown of 1948 air conditioning sales in a metropolitan area, with such information as where air conditioning was installed, the number of makes of equipment, and dealer-contractors who shared in the business, will be found on pages 18-20.

Television studios are literally a "hot" market for comfort cooling. A down-to-the-last-detail description of an installation for a TV studio is on pages 25-27.

What's the best effective temperature for industrial plant workers? A discussion based on facts taken from studies made on the subject is on pages 22-23.

For those interested in the technical side there are articles "Factors Involved In Estimating Air Conditioning Load" on pages 28-29; and "Simplifying the Selection of Air Conditioning Coils," on pages 36-37.

A limited number of extra copies of this issue are available at a cost of 20 cents each; or 15 cents each in quantities from 10 to 50; and 10 cents each in quantities of 50 or more.

**Ultra-Cold, Inc. Produces
2 'Combination' Models**

LOS ANGELES—Two new dual-purpose appliances—a combination refrigerator and electric or gas range and a refrigerator combined with an electric or gas cooking top—have just started coming off the production lines of Ultra-Cold, Inc., according to an announcement by Carl Conkle, president.

The refrigerator in each combination has a capacity of 4 cu. ft. and provides 8 sq. ft. of storage space. Also included in the refrigerator is
(Concluded on Page 41, Column 4)

**Massachusetts
Groups Oppose
Steamfitter Bill**

**Piping Inspection Board
Means 'Needless Expense,'
5 RSES Chapters Claim**

BOSTON—Five Massachusetts chapters of the Refrigeration Service Engineers Society are up in arms over a bill which calls for the establishment of a board of examiners to regulate steamfitting in the state.

One of the groups, the Whaling City Chapter in New Bedford, announced that it would distribute petitions asking for defeat of the legislation (Senate Bill 461).

The announcement was made following a meeting at which the chapter opposed the bill on the ground that it would needlessly increase service costs to the householder and businessman by requiring steamfitters for refrigeration and air conditioning work.

Steamfitting is defined in the bill as including "all piping for industrial or power purposes, for heating operations, fittings, radiation, valves, and appurtenances, necessary to complete a system of steam or hot water heating, refrigeration and air conditioning, and piping used to conduct steam for heat or power."

Arthur Belliveau, president of the chapter, explained that his group
(Concluded on Page 4, Column 5)

**Bendix Cuts Price
On 2 Washers**

SOUTH BEND, Ind.—Price reductions of \$30 and \$34.95 respectively on the G-315 and G-130 Gyromatic models of the Bendix automatic washer have been announced by Judson S. Sayre, president of Bendix Home Appliances, Inc.

At the same time, other company officials indicated that the firm's new Rand washer may be shown at a distributors' convention in June.

The price of the G-315 was reduced from \$349.95 to \$319.95 and the G-310 from \$329.95 to \$292.00. The reduction is effective immediately and dealers will be given rebates covering their current inventory, the company declared.

No reduction was made on Bendix' other three automatic washer models and Parker H. Erickson, director of
(Concluded on Page 4, Column 5)

**Anderson Is Westinghouse
Household Div. Mdse. Mgr.**

MANSFIELD, Ohio—The appointment of J. J. Anderson as merchandise manager of household refrigeration for the Westinghouse Electric Appliance division, here, has been announced by T. J. Newcomb, sales manager.

Anderson succeeds A. R. Heck, who was made merchandise manager of plumbing and heating distribution for the division.

The new merchandise manager was assistant manager of the division's service department.

Anderson received a degree in electrical engineering from Texas A. & M. in 1937. He joined the Westinghouse student course in that year and specialized in air conditioning.

In November, 1944, he was assigned to the division's New York office as supervisor of refrigeration specialties; and in 1945, was transferred to Mansfield as assistant manager of the service department.
(Concluded on Page 41, Column 1)

Pinnacle

DAIRY
BEVERAGE
VEGETABLE

Refrigerators

... a step ahead
of competition!

Check THESE FEATURES
FOR QUALITY CONSTRUCTION!

- Frame constructed of dry No. 1 Lumber securely fastened together with screws.
- Government approved insulation.
- Exterior top, back and bottom covered with aluminum or other rust resistant metal.
- Front and ends finished in two coat gleaming white porcelain.
- Interior

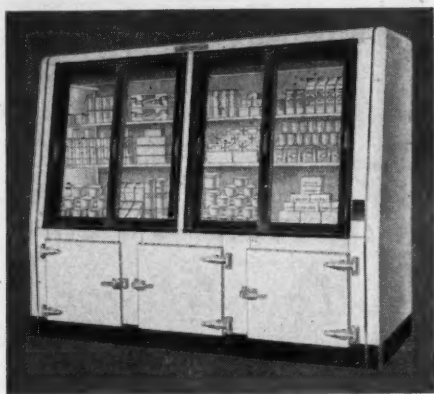
- finished in porcelain and Stainless Steel.
- Soft fluorescent lamps in display section . . . automatic light in storage compartment.
- Exceptionally large doors that slide easily at the touch of your fingers.
- Extra storage compartment at bottom.
- Long, satisfactory, economical service.

A few exclusive Pinnacle territory Franchises are still available. Wire or write immediately for full information.

FREE FOLDERS
of complete line

Pinnacle
EQUIPMENT CORPORATION
FLEETWOOD, PENNSYLVANIA

Export Dept.: 39 Broadway, New York



Salt Lake City Makes Gas Ban Permanent

SALT LAKE CITY—A ban on all gas connections on gas appliances for cooking, water heating, and refrigeration after July 1 has been ordered here by the Utah State Public Service commission.

The commission's order makes permanent a previous temporary injunction on gas heating and expands it to cover the above-mentioned appliances.

It followed testimony by the Mountain States Fuel Co. that the extra demand created by the rapid growth of Salt Lake City has placed a drain on the utility's natural gas fields.

In public hearings on the proposed ban, put forward by the utility, gas appliance dealers had fought the idea and indicated that they would carry their fight to the state supreme court if the ban were put into effect.

Fedders-Quigan Names 8 Firms To Distribute Line

BUFFALO—Appointment of eight new distributors of Fedders room air conditioners has been announced by F. A. Mitchell, sales manager of the unit air conditioner division, Fedders-Quigan Corp. here.

They are A. E. Borden Co., Inc. of Boston; Johnson Refrigeration Sales Co. of Detroit; General Electric Co. of Oklahoma City; The Frank Corp. of Savannah, Ga.; Mott Bros. Co. of Rockford, Ill.; Ara Distributing Co. of St. Louis; Brownlow's, Inc. of Winston-Salem, N. C.; and Nicholson, Inc. of Durham, N. C.

Salesman Group To Use New Data In Bid for Social Security Change

WASHINGTON, D. C.—Results of a survey taken by the National Council of Salesman's Organizations among six of its member groups, which shows that as high as 21% of those polled are not covered by Social Security, were to be presented to the House of Ways and Means Committee by the council.

The committee is holding public hearings on amendments proposed to extend coverage of the Social Security Act. The council says findings of the survey will disprove claims made last year by proponents of the Gearhart amendment to the effect that only certain classes of commission salesmen who are classified as self-employed would be exempted from Social Security coverage.

According to an analysis of the survey, the percentage of salesmen not covered by Social Security under any methods of compensation were:

Straight commission only, 21%; drawing account plus commission, 10%; straight salary, 7%; salary plus commission, 5%; and those handling more than one line, compensated under two or more methods, 10%.

Council president Louis Capaldo said his group believes "the salesman's status under Social Security should be finally defined and established, as it seemed to have been under two Supreme Court decision returned in June, 1947, until the Gearhart amendment was enacted last year to restore confusion and jeopardize the rights of too many salesmen."

"A new amendment at this time which would merely extend coverage to self-employed persons would not satisfy our needs, because that would simply assess the expense of coverage against the individual covered, instead of charging 50% against the manufacturer whose goods he sells."

"And coupled with the proposal to increase the amount of income assessed for coverage from \$3,000 to \$4,500 a year, the presently so-called 'self-employed' salesman would be the victim of a grave injustice. We believe this can only be rectified by definitely establishing the salesman's status as an employee in any new Social Security amendment."

Kelvinator, Leonard Will Cut Output to '48 Level

GRAND RAPIDS, Mich.—Change of Kelvinator and Leonard production schedules beginning April 18 to slightly above monthly averages for the 1948 fiscal year, was announced recently by J. W. Lelivelt, works manager. This will reduce output by 400 units a day, and will affect about 500 employees at Grand Rapids, he said.

Kelvinator and Leonard appliance sales for the January-March quarter were above the comparable period of a year ago, according to C. T. Lawson, vice president in charge of sales, Kelvinator Div., Nash-Kelvinator Corp.

Sales of apartment house models are beginning to reflect the effects of the slowdown in building activity and the impact of new rent control regulations on the apartment house replacement market, Lawson said. The production change will result in better balancing of inventories of models influenced by these and other sales factors, he stated.

Hotel Includes 300-Ton System In Remodeling Plan

DALLAS, Tex.—A 300-ton all weather air conditioning system has been installed in the 12-story Texas Bank bldg. at Main and Lamar Sts. here, and will be ready for operation when the expansion and remodeling of the banking quarters are completed in June, according to P. B. Garrett, president.

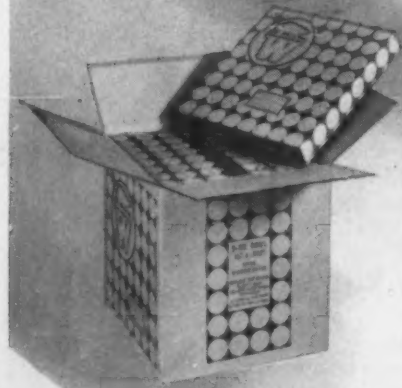
The system includes a Worthington-General Electric centrifugal refrigerating machine and a steam-to-water heat exchanger, Garrett said.

St. Paul Electric Appliance Dealers Elect Kunze President

ST. PAUL—St. Paul Electric Appliance Dealers Association has elected Harold A. Kunze president for 1949.

Paul Marien was elected vice president and Mort Benson, secretary-treasurer. Elected directors were Ernest Hintz, Bud Standeven, L. R. Watson, H. R. Peterson, and C. M. Taylor.

You'll be proud
to display
**Wolverine Copper
Refrigeration Tube**



Individually cartoned
in 50 foot coils

It's attractive—both inside and out. The bright finish outside readily meets approval of the eye—and the smooth, dry, clean finish inside meets your customers' requirements of use in a most efficient way.

After being thoroughly inspected the tube is crimped and solder-sealed—protecting it against moisture and dirt.

WOLVERINE TUBE DIVISION
CALUMET AND HECLA CONSOLIDATED COPPER COMPANY
INCORPORATED

MANUFACTURERS OF SEAMLESS NON-FERROUS TUBING

1415 CENTRAL AVENUE

DETROIT 9, MICHIGAN

ANSUL OIL

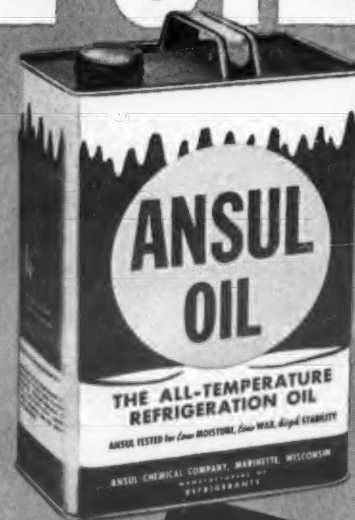
THE ALL-TEMPERATURE
REFRIGERATION
OIL

Recommended for air conditioning
and refrigeration systems
using standard refrigerants.

ANSUL OIL is an ALL-Temperature Refrigeration Oil which conforms to the rigid wax-free specifications established by Research. It will not separate wax when mixed with a refrigerant (under specified conditions) and subjected to temperatures as low as SEVENTY DEGREES BELOW ZERO (Fahrenheit).

ANSUL OIL has been machine tested for lubrication and wax-free characteristics in both high and low temperature installations. It is absolutely uniform . . . maintains high stability and has a low oxidation rate. It has proved suitable for ALL refrigerating systems using any of the standard refrigerants.

Ansul Research was first to recognize the problems resulting from low-temperature wax separation in oil-refrigerant mixtures. It realized the critical need for an oil which would not only lubricate and protect moving parts but would also eliminate the persistent troubles which were traced to wax-separation from oil-refrigerant mixtures.

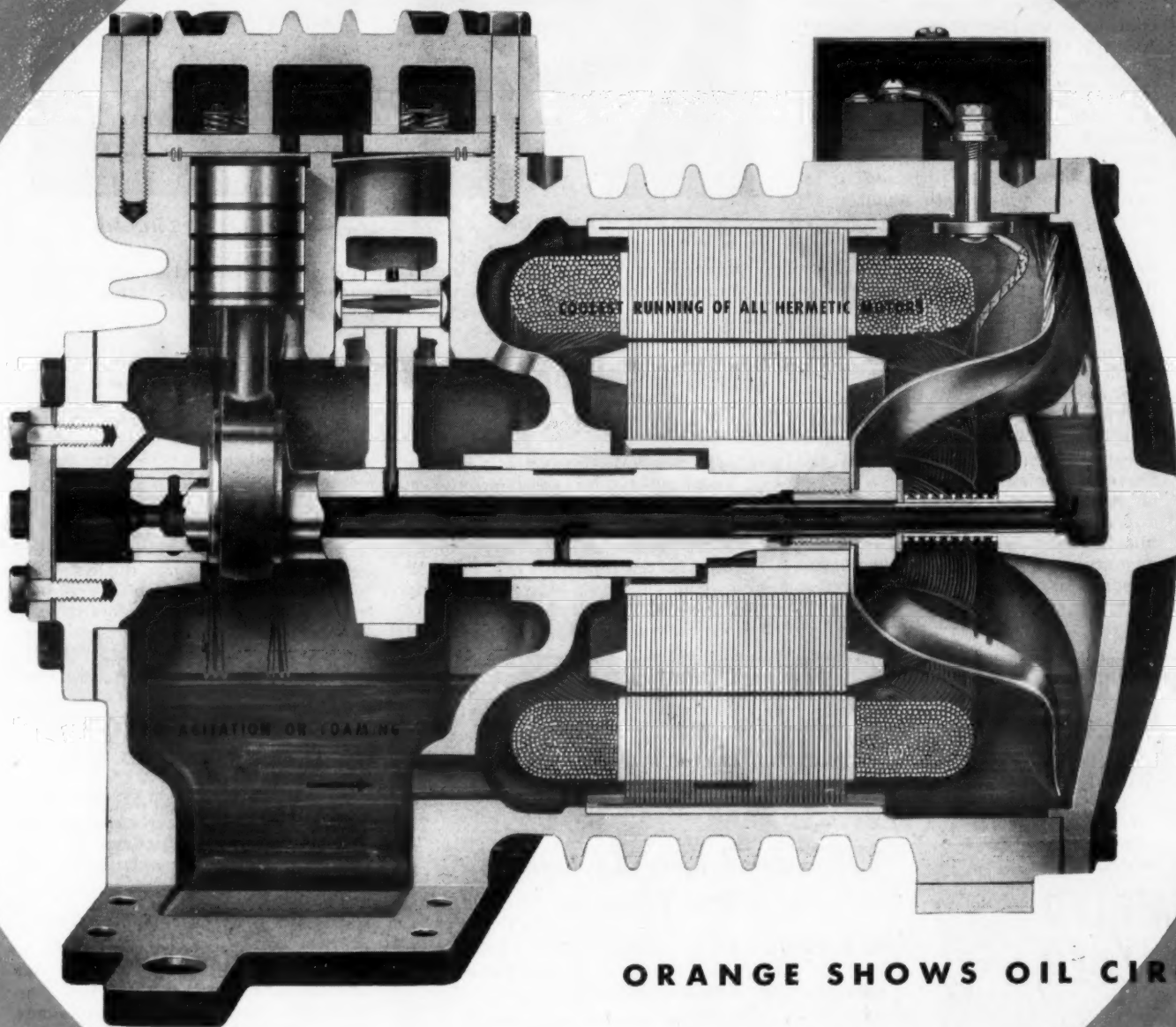


ANSUL TESTED
FOR
✓ LOW MOISTURE
✓ LOW WAX
✓ HIGH STABILITY

ANSUL 150 OIL — The All-Temperature Refrigeration Oil — is sold by leading refrigeration wholesalers everywhere. (If you require a higher viscosity oil ask for ANSUL 300.) Get ANSUL OIL where you buy your Ansul sulfur dioxide and methyl chloride.

ANSUL CHEMICAL COMPANY
REFRIGERATION DIVISION, MARINETTE, WISCONSIN
ANSUL SULFUR DIOXIDE, ANSUL METHYL CHLORIDE, ANSUL OIL, KINETIC FREONS

NOW UP TO 7½ H.P.



ORANGE SHOWS OIL CIRCUIT

COPELAMETIC

THE ACCESSIBLE HERMETIC

count Copeland in on your AIR-CONDITIONING and REFRIGERATION installations



Illustration shows 7-1/2 H.P. motor compressor

Smooth, quiet Copelametic gives greatest value for your air-conditioning and refrigeration dollar. Look over the BTU ratings and see what we mean. Copelametic is the hermetic that combines the finest features of all types of units. Field-accessible . . . never a reason to return it to the factory.

Copelametic eliminates belts, seals, manual motor oiling. Cutaway illustration shows how oil reaches all bear-

ing surfaces by forced-feed lubrication. One-piece compressor and motor housing maintains perfect alignment for bearings and cylinders. Large integral cast fins around housing dissipate heat rapidly for highest efficiency. In addition, motors are water-cooled above 2 H.P.

Copelametic units can be used on any application now served by open units. Motors for any standard currents.

Models from 1/6 H.P. to 7-1/2 H.P., inclusive.

EXPORT DEPT.
60 WALL TOWER
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DEPENDABLE *Electric* REFRIGERATION

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COPELAND REFRIGERATION CORPORATION • SIDNEY, OHIO
MANUFACTURERS OF: REFRIGERATION UNITS, (OPEN-TYPE AND COPELAMETIC), WATER COOLERS AND REFRIGERATORS

SPECIFY
DELAVAN
WHEN YOU NEED

PISTONS



A COMPLETE LINE OF COMPRESSOR REPLACEMENT PARTS

DELAVAN MANUFACTURING COMPANY
3009 SIXTH AVENUE
DES MOINES 13, IOWA

Truman Request--

(Concluded from Page 1, Column 2)
tion W beyond its present expiration date of June 30.

The statement by the chief executive came upon the heels of rumors in the capital that the Federal Reserve Board was planning further changes to ease controls, by taking certain products off the list of items covered by the controls, and to lift the present exemption from \$50 to a higher figure.

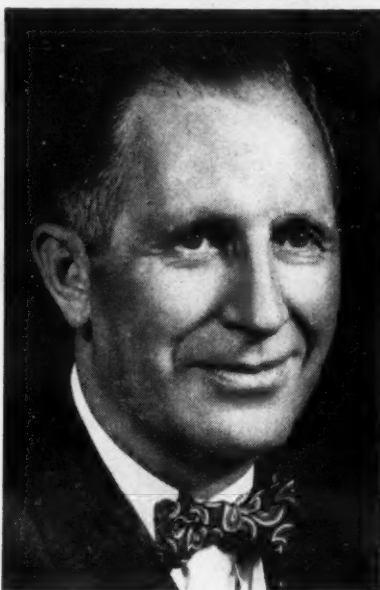
Rep. Patman (Texas), who heads the House Small Business Committee, continued to call upon the Federal Reserve Board to abolish completely consumer credit control under Regulation W.

A letter sent by Patman to Federal Reserve Board Chairman McCabe asks that McCabe advise him as soon as possible "of your attitude in regard to the immediate abolition of Regulation W."

The congressman recalled that he had earlier urged the board to relax its consumer credit controls and that McCabe had given him an answer indicating the board believed relaxation or complete elimination of Regulation W would build up inflationary pressures.

"The halfway measure granted by your board certainly had no such effect," Patman declared. "To the contrary, since the revision, prices on durable goods have been taking appreciable drops—note the automobile industry—and I am unaware of any credit buying sprees of sufficient import to occasion the slightest alarm."

Assuming New Posts at Norge



J. R. CAMERON

As part of recent changes made in the sales organization at Norge, Cameron becomes merchandise manager and Spencer takes over management of refrigeration sales.



DEAN SPENCER

Steamfitter Bill--

(Concluded from Page 1, Column 5)
objects to inclusion of the phrase "refrigeration and air conditioning" and another clause which would require a master steamfitter to obtain a permit before commencing any steam or refrigeration and air conditioning work.

"If this bill is passed, Belliveau declared, "the general public as well as restaurant and dairy operators will not only be paying a refrigeration serviceman but also the needless expense of a steamfitter for repair and installation work."

"The sole duty of the steamfitter would be to obtain a permit and instead of merely paying for the refrigeration man on the job, the public also would have to bear the expense of having a steamfitter stand by."

During hearings on the bill in Boston earlier, Charles C. Harris, RSES president, told the legislative committee on state administration that the legislation would not only increase expense to consumers but prohibit refrigeration engineers from doing any fitting.

The committee also heard protests from James J. Morris, representing the heating, piping, and air conditioning association of Boston, and Edwin Loija, representing the Massachusetts State Association of Power Engineers.

Morris said he favored the principle of the bill but opposed the measure in its present form. He claimed that the bill as it now stands would require every city and town to appoint an inspector, create many unnecessary inspecting jobs and increase expenses of municipalities.

"Somebody has tried to give somebody else the razzle-dazzle," Loija observed. "If the steamfitters want to be licensed well and good. However, we don't like the steamfitters coming in and telling power men what to do."

Protesting that power plant men are adequately taken care of by present law, Loija said the bill would prohibit power men from doing minor pipe repairs.

Also appearing before the committee were more than 120 steamfitters, who favor the legislation as a measure of public safety, and Clarence L. Damon of New Bedford, who petitioned the bill. Damon said many fires have been started because of faulty heating installations.

Legislators from Gloucester, Fall River, Springfield, and other sections of the state reportedly favor the bill. John J. DelMonte, state commissioner of labor and industries, and Kenneth J. Kelley of the Massachusetts Federation of Labor are also said to be supporting the measure.

Bendix Price Cuts--

(Concluded from Page 1, Column 5)
sales, declared that list prices on all five models will now be guaranteed until July 15.

"Bendix dealers," Ericksen said, "are now in a position to develop their sales activities to the fullest to take advantage of the all-important spring selling season with complete knowledge of the price structure of the Bendix washer line."

Concurrently with the price reduction announcement, Bendix officials revealed that development work on the Rand automatic washing machine which operates on a suction cup extraction principle is about completed.

The officials indicated that the new washer will be priced at less than \$200 and will be intended to attract customers to Bendix dealers' stores where they can be sold up to the regular Bendix models. The new washer is not to be competitive with the Bendix machines, they noted.

The Rand washer is reported to be square shaped with washing and extraction done in a rubber bag which collapses when the air inside is removed. The washer will be a top loader.

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Utility Selling Law Action Postponed--

(Concluded from Page 1, Column 4)
reports Stanley A. Dennis, secretary of the group, and sales promotion manager of the Columbus and Southern Ohio Electric Co.

"Most local dealers are smart enough to realize that they may sit and counsel with their servicing utility so that the greatest benefit to

the public and to themselves can be accomplished on a friendly basis," Dennis declared.

Outlining the views of the utility he represents, Dennis explained:

"In our central division we have not merchandised since the war, and while we have tried in every way possible to be of service to the local dealers so that the ultimate consumer (our customer) would receive the best service from their new electrical appliances, we are requested daily by the too-much-pushed-around public:

"Why can't we buy this equipment from you?"

"I think it is a known fact that wherever a utility merchandises you will find a higher standard of sales and service being rendered to the public," Dennis declared.

REASON BEHIND PROMOTION

"To make possible the tremendous expansion of utility services it has been quite necessary that they promote the greater use of appliances. I think the whole electrical industry, dealers included, will have to admit that their success very closely follows the aggressiveness of their power suppliers.

"For example, the average electric ranges sold on our line each month since the war, up to Dec. 31, 1948, averaged 150. At about that time the so-called lush period began to die out, and in January, 1949, range sales dropped to 77, February to 66, and March to 62.

"While there are many spoken reasons for this drop-off there is only one that will hold water, and that is that we changed from a seller's market to a buyer's market with the retailers not being prepared to do a sales job," Dennis emphasized.

"It is not that we wish to go back into the merchandising of appliances that we would oppose House Bill No. 435, but that such legislation would tend to revoke our inherent rights set forth in the Constitution some 150 years ago.

"I think we will all admit that the progress of this nation has been built from the practice of free enterprise, and that our standards have constantly risen due to a free market and competition. In our opinion any step made to legislate business activities is just a step closer to socialism.

BIG MFRS. MIGHT SUFFER

"For example, the General Electric Co. in their true sense are manufacturers of generating and transmitting equipment; therefore, under this new order perhaps they should not be permitted to manufacture electrical appliances. The Westinghouse Electric Co. started with the manufacturing of air brakes, and while holding that business has risen into the appliance field.

"Our local department store, the F. & R. Lazarus Co., has many departments to service the public and just recently built a huge building for the parking and servicing of automobiles. Many electrical dealers during the wartime scarcity of appliances went into the furniture business, so by keeping the above in mind there can be only one answer: House Bill No. 435, along with any other business regulatory legislation, must be defeated if America is to grow," concluded Dennis.

YOUR TIME IS MONEY!

Streamline LINE VALVES
CAN BE DIS-ASSEMBLED
AND READY TO SOLDER
INTO LINE IN 10 SECONDS

YOU wanted these Advantages in a Line Valve—

TIME SAVING:—Easily disassembled before soldering. Entire operating unit consisting of stem, collar and bonnet removable in one piece.

SAFE:—Should the bonnet be removed from the valve with pressure in the line, the "O" ring reaches vent holes before the threads disengage, allowing the gas to escape.

POSITIVE SEALING:—The use of the "O" ring between the stem assembly and valve body of this STREAMLINE Packed Refrigeration Line Valve provides a permanent, positive seal against loss of refrigerant, and also prevents infiltration when operating in vacuum.

LIGHTER IN WEIGHT:—Revolutionary design eliminates flanges, bolts and gaskets.

BODY:—Actual full-flow—close grain red bronze.

STEM AND DISC HOLDER:—Two-piece, full floating, anti-rattle construction. Stem is of back-seating type, providing double seal and means for repacking if necessary.

MOLDED NYLON STEM DISC:—Considered the best material for refrigeration purposes.

INSTALLATION:—Cadmium plated steel mounting plate and screws provided.

INDIVIDUALLY CARTONED:—Protects your investment until ready to use. Clean, safe from damage in transportation to the job.

FAMOUS STREAMLINE QUALITY THROUGHOUT
— ORDER FROM YOUR WHOLESALER



- NO BOLTS!
- NO GASKETS!
- NO FLANGES!
- NO WRENCHES!
- NO EXCESS WEIGHT!

3/4" O.D. TO 4 1/4" O.D. INCLUSIVE

MUELLER BRASS CO.
PORT HURON, MICHIGAN



YOUR BIG MOMENT!

Today your prospects again approach the products you offer with searching eye and "show me" attitude. They want verbal and visible assurance that they're getting the biggest possible dollar's worth for every dollar they're asked to spend.

That's why, when they stand before a 1949 Kelvinator and reach to open the door, that moment is all-important to you.

For Kelvinator extra-value is something you can easily demonstrate . . . something the prospect can see . . . *and feel.*

It is visible in the greatly increased storage space . . . the bigger frozen storage compartments . . . the abundance of tall bottle space. It is dramatically present in Kelvinator's new "Cold Clear

to the Floor" design . . . Moist-Master food-keeping . . . in the Cold-Mist Freshener . . . in the new Fruit Freshener . . . in the matchless performance of the Polarsphere.

It is convincingly evident in the sweet, smooth action of the latch, its positive pull on closing . . . the rigid, multiple-braced doors . . . the extra-long door hinges and the extra strength of the shelves.

These—and a score more—give valid answer to your prospects' search for honest value . . . an answer they can *understand, appreciate . . . and buy!*

They explain, in part, why your Kelvinator Franchise is the most valuable in the appliance industry today.

TUNE YOUR RADIO TO EDWIN C. HILL and "THE HUMAN SIDE OF THE NEWS," Monday through Friday . . . another retail-minded contribution to the progress of Kelvinator Dealers.

GET MORE . . .

Get **Kelvinator**

... THE MOST VALUABLE FRANCHISE IN THE APPLIANCE INDUSTRY

KELVINATOR, DIVISION OF NASH-KELVINATOR CORPORATION, DETROIT, MICHIGAN

INSIDE DOPE

by GEORGE F. TAUBENECK

(Concluded from Page 1, Column 1) time for fetish-defying ideas to pay off. The creative man who believes in these new ideas must have consummate patience. He must be willing to brave the taunts and slurs of his family, the eyebrow-lifting of his friends, the tut-tutting of his associates—and still be brash enough to keep on hammering away at his new idea.

Persistence is a handmaiden of Luck, as Osborn proves with several convincing examples.

Osborn also is captivated by the truism that many inventions are accidental. They aren't "lucky," though. These accidental discoveries nearly always "happen" to hard-working men who are imaginative enough to envision their possibilities.

Perspiration, and Persistence, and Perspicacity! That's his message.

Keep your eyes and ears and mind open, never quit trying or dreaming, and you may get rich—and, in the bargain, enrich the world!

It's Easier to Criticize Than to Create

Osborn gives new life to an oft-forgotten Truth when he deplores mankind's natural tendency to criticize new ideas and "eager beavers."

It's ego-elevating to be a Critic.

One thus assumes a superior role. Criticizing is a relatively easy way to acquire (in one's own mind) self-preening Stature. The Critic feels that he's quite a fellow after he's stomped on and tramped down an original conception.

Possibly that's why conferences and committees can be so futile. They often degenerate into mutual disparagement, and wind up deciding that nothing can be done. Takes a strong man to keep fighting for his Unconventional Idea against the hyper-critical bone-picking of carping associates.

The brash man, the non-conformist—the egoist, if you please—is often lonely. If he perseveres, he deserves medals for bravery. What's more, it's getting tougher and tougher for him to get paid for his courageous creativeness. Present codes of Social Acceptability are against him, and so are punitive tax laws.

Current philosophy favors a "play safe" attitude. . . . Don't dash for second base when the pitcher winds up overlong. You might be thrown out. . . . Don't make a suggestion which hasn't been "cleared through channels." You could endanger your job and your pension. . . . Keep your neck in and your nose clean. Wait for the Egoist to make a mistake—then pounce on him. . . . Never lead; follow. . . . Always recoil from criticism. . . . Be a Big Shot in one easy lesson by scorning anyone who dares to be Different. . . . Take it easy—don't be a sucker by working hard. The "government" will take care of you. . . . Let the rich S. O. B.'s pay for everything and anything. They've got the money—so let's slow down; stretch out your jobs, and make 'em

pay through their big fat noses. . . . What's that you say? "Little people" need automobiles and refrigerators, too? . . . Go 'way, son. You bother me. The "government" will fix everything up. . . . Hm-m-m. Shall I go fishing tomorrow, or should I show up at the plant? Well, it's this way. . . .

Back to Alex Osborn's book, "Your Creative Power." To our way of thinking, it's the most significant book we've read in years. It should be "must" reading for every high school and college student, and for millions of voting citizens, too.

Sheriff Schellenberg

At least 5,000 of our subscribers, we feel sure, will be interested in knowing what Art Schellenberg is doing these days. (Art is the former president of Alco Valve Co., and of the Refrigeration Equipment Manufacturers Association.)

For those late-comer subscribers who many not know him, here's a briefing on this remarkable fellow: Art joined Alco Valve in 1929, and was Alco's president and general manager from 1939 to 1945.

When he resigned so surprisingly in July, 1945, Art had just completed his term of office as president of the Refrigeration Equipment Manufacturers Association. At that time he was also leader of the General Industry Advisory Committee of the War Production Board, a member of the executive committee of the American Society of Refrigerating Engineers, and one of the most popular fellows our business has ever known. Art was the perennial Com-

mittee Chairman—the canny diplomat who wooed the phantom of Industry Cooperation so winningly. We've all missed him lately.

At the apex of his career, Art's doctor advised him to take it easy in Phoenix, Arizona. So he did—for awhile.

Casting about for something to occupy his extraordinarily active mind, he learned that a monthly magazine for western law enforcement officials was on the block. He promptly took it off the block, thus launching himself on an entirely new career as an editor and publisher.

The Sheriff, the magazine he bought, is now in its eighth year. It is the official journal of the Arizona County Attorneys' and Sheriffs' Association. Art, of course, is a member of the Arizona Newspapers Association, the Phoenix Junior Chamber of Commerce, and practically every other civic and cooperative body in that region. He's having a wonderful time, and doing a lot of good—as usual.

He's On the Ball

After reading several copies of Art's magazine, *The Sheriff*, it is our opinion that the former Rema president is doing a bang-up job as a publisher. The photographs on the covers are good, sometimes even striking; the stories about local law-enforcement folk are interesting; the "how-to-do-it" articles very readable; the features on Arizonians of the past—both famous and infamous—fascinating; the editorials well written; and the headlines catchy.

A quick glance through one issue, picked at random from the pile he sent us, will serve to indicate more exactly the type of material Art serves up to his readers.

The cover of this issue of *The Sheriff* bears a fine photograph of "Sarah," one of eight bloodhounds used by a local Dick Tracy to track down criminals. A story about these dogs is the lead-off feature of that issue. Next comes an article headed "The Case of the Corpse in the Culvert," in which the sheriff of Cochise County tells a few secrets about detective work. On the following page, a Maricopa County attorney answers an embarrassing question: "How Can Law Enforcement Men Avoid Making False Arrests?"

Thumbing on, the reader finds some advice on "Efficient Use of the Wire Recorder," and an instalment in the continued-story biography of Col. King S. Woolsey, "Arizona's most famous and romantic pioneer."

In addition, *The Sheriff* contains forceful editorials, significant news items, and two regular departments—"Lawyers' Briefs" and "Sheriff's Teletype."

One of the editorials in this issue views with alarm Arizona's crime rate and another urges formation of an active joint committee of lawyers and law enforcement men to do something about it.

Sounds like Art Schellenberg, hey? That's Our Boy!

Other issues of Art's publication have presented informative articles on the science of making suspects talk, hiring, and firing under civil service, minimizing officer-violator conflict, tips on investigation, and scientific examination of evidence by the use of invisible radiation.

Feature stories which are eminently readable and entertaining have delineated the Oatman Massacre, the deputy sheriff with wings, Arizona's last successful train robbery, Sheriff Lowe and the Chinese murder case, "the intellectuals of the underworld" (counterfeiters), and the Phoenix Plan for scaring hell out of juvenile delinquents.

Many of the stories in *The Sheriff* appear under such attention-getting headlines as "Conversing With Corpses," "Tom Hart Stole an Iron

Horse," "He Traded His Tuxedo for a Badge," and "What Did the Irish Know About Finger Prints in 1689?"

His hard-hitting editorials indicate that instead of worrying about the sale of valves or what he is going to tell the next refrigeration convention, Art is now concerned with such problems as the high cost of bad checks and the prevention of juvenile crime.

He is also involved in such lesser matters as how long justices of the peace should hold office, what sheriffs talk about when they get together, and expaining to readers why the fingerprint photograph on the last issue's cover was upside down.

A recent Schellenberg editorial, addressed to Arizona's 19th Legislature, is worth quoting. After expressing admiration, understanding, and sympathy to the legislative body (that's Our Boy talking!) Art suggested that a day or two be assigned for the discussion of, and action on, law enforcement legislation only.

"If you of the legislature were to consider all the proposed law enforcement bills at one time," our old pal wrote, "you would have the opportunity of getting a good over-all picture of the complex law enforcement situation in our state—a rapidly growing state with more than its share of a serious national post-war crime wave. . . ."

"When we first considered proposing that a portion of your session be devoted exclusively to law enforcement we weren't sure it was smart. We thought of how much more our kids often get out of us when they ask for one little favor, or only a nicker at a time, than they get when they confront us with a large project or a \$5 deal.

"But we soon remembered that law enforcement isn't exactly kid stuff and when we appraised the sound, logical legislation proposed we weren't so worried. . . . We felt confident that in your sifting of the many pressing problems according to their relative importance, you would recall that the territory of Arizona laid the foundation for our present rapidly growing state only after law and order was established.

"Custom and precedent may throw a few barriers in the way of an all-law-enforcement meeting, but we trust they can be surmounted, and we feel certain that the end result will justify kicking over a few hurdles."

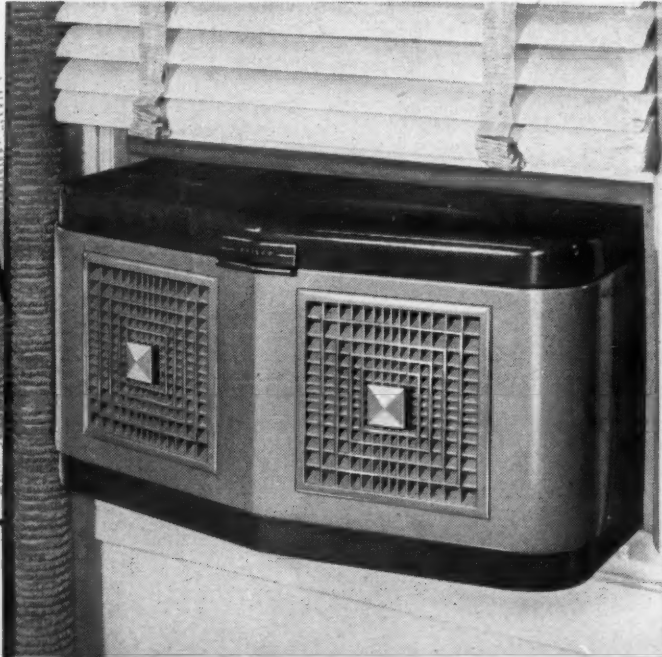
Along with his duties as editor and publisher of *The Sheriff*, brother Schellenberg has become active in the affairs of several western commercial and welfare associations.

This will come as no surprise to Art's loyal old friends. Any day now we'll expect to read in the news dispatches from Washington, D. C. that "Arizona's Senator Schellenberg interrupted the debate on the floor and suggested that cooperation. . . ."



Get Your Share of this Profitable New Business

Again, Philco, the leader in single room air conditioners, brings you the news. The new 1949 Philco Air Conditioners are ready now! You can start at once to ring up record-breaking 1949 sales and profits. Everywhere the demand is growing . . . for homes and offices. See them now at your Philco Distributor.



PHILCO 61-D—Handsome, Advanced Design window-sill model in two-tone brown cabinet. Powerful unit has cooling capacity up to 5600 B.T.U. per hour. For year 'round use in bedrooms, offices, etc. Also in ivory (Model 61-DL).



PHILCO 91-CE—Console model in stunning walnut cabinet. Has power to serve large living rooms and private offices. Cools in summer—ventilates all year. Cooling capacity . . . up to 8800 B.T.U. per hour. Hermetically sealed 3/4 H.P. unit.



PHILCO 76-E—Maximum cooling capacity in minimum space. Up to 7730 B.T.U. per hour. Provides fresh, filtered air all year. Hermetically sealed 3/4 H.P. unit. Compact two-tone brown cabinet. Also available in ivory (Model 76-EL).



COMPLETE ICE PLANTS & ICE PLANT SUPPLIES

Diesel and Electric Plants, Agitators, Fillers, Dumpers, Air Agitation Systems, Pressure Vessels, etc.

RECO PRODUCTS DIVISION
2020 NAUDAIN STREET, PHILA. 46, PA.

Wall WIRE PRODUCTS COMPANY

Manufactures of...

REFRIGERATOR SHELVES · STAMPINGS
FORMED AND WELDED PRODUCTS



We at Wall Wire Products Company welcome any opportunity to cooperate on all matters relating to design, engineering and manufacturing of Refrigerator Shelves, Trays, Racks, Dividers, etc. . . . whether made of Stainless Steel or Basic Wire.

WALL WIRE PRODUCTS COMPANY Plymouth, Michigan



BAKER

AIR CONDITIONING AND REFRIGERATION

Announcing **BAKERAIRE**

the Deluxe Packaged Air Conditioner
for stores, restaurants, offices,
beauty parlors . . .

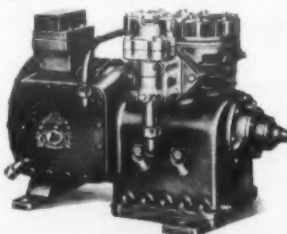
BAKERAIRE gives all the comforts and benefits of complete 4-way air conditioning. (1) It de-humidifies and cools the air. (2) It filters and circulates the air. (3) It can bring in fresh air. And (4) it can heat the air, for with the addition of steam or hot water coils inside the cabinet, the unit becomes an efficient circulating heater.

Broad Market Opportunity with 3-, 5-, 7½- and 10-Ton Units

BAKERAIRE is available in eight models, providing 3-, 5-, 7½- and 10-ton ratings; with fan capacities of 1,200, 2,000, 3,000 and 4,000 cubic feet of air per minute.

BAKERAIRE combines the latest and best in modern engineering and styling. Refrigeration is supplied by a powerful Baker Freon Condensing Unit (either Hermetic or Open Types) — crowning achievement of 40 years' experience in refrigeration engineering. All coils, filters, grilles, fans and motors are of advanced design. Manual control is extremely simple; automatic controls insure safety and maintain uniform, economical operation. Cabinets provide easy access to equipment — are insulated against heat and noise — and are beautifully styled and finished.

Baker Hermetic Condensing Unit shown here. The Baker Open Type Unit is also available.



Big Opportunity for Distributors in the Baker 8-Star Line

Now, under one famous name, BAKER offers Distributors and Contractors an 8-Star Line of Air Conditioning and Refrigeration equipment. Key to top performance and dependability are the Baker Compressors and Condensing Units (Freon and Ammonia) with all accessories. Modern "packaged" units include BAKERAIRE and CENTRAL-AIR in air conditioning; KOLD-CELL (warm-room lockers) and BAKER ICE-FLO (automatic solid ice cubes) in refrigeration.

Write for the whole story: a Name, a Line, an Authoritative Engineering Service, and a liberal Distribution Policy.

95-A

BAKER REFRIGERATION CORPORATION

(Formerly BAKER ICE MACHINE CO., INC.)

General Offices: South Windham, Maine • Factories at Omaha, Nebraska and South Windham, Maine



80-DRAWER UNIT

**FREEZES THE FOOD
NOT THE PEOPLE!**

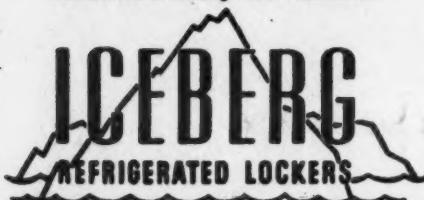
**A MODERN DEVELOPMENT IN
FROZEN FOOD LOCKER PLANTS**

Some choice territories available

Write, Phone or Wire

ICEBERG LOCKERS, INC.
175 West Jackson Blvd., Chicago 4, Ill.

Advertised in leading Food Publications



EXTRA COPIES

of this issue
**AIR CONDITIONING &
REFRIGERATION NEWS**

available for
limited time.

20¢ each

10 or more—15¢ each

50 or more—10¢ each

ORDER NOW!

Air Conditioning & Refrigeration News
450 W. Fort St.
Detroit 26, Mich.

Dealer Changes Timing of Room Cooler Ads To Meet Altered Market Conditions

Shortage Over, He Appeals to the Price-Conscious

By Phil B. Redeker

CHICAGO—This year, the man who calls himself "Chicago's Largest Dealer In Portable Air Conditioners," is going about the business of advertising room air conditioners in a manner different from his advertising efforts in the other years following the War.

In previous years Utilities Air Conditioning Co. used display advertising in Chicago newspapers well in advance of the comfort cooling system—in March or April. They were very effective then—the one last year pulled over 300 inquiries—but James F. Brown of Utilities doesn't think advertisements run in the newspapers at such an early date this year would draw.

What's the reason for this change in strategy—how is this season different from the previous postwar ones?

Well, last year there was still a scarcity of many things—including room air conditioners, Brown points out. Prospective buyers were aware of this and so rather than to take a chance of being shut out of getting a unit when the hot weather rush came about, they were glad to make an early purchase and get an out-of-season installation.

This year, however, the prospects have become cagier, and they know that the period of shortages is over. Furthermore, like prospects for many other kinds of merchandise, they are of the notion that prices may drop somewhat.

Thus, Brown has switched his advertising strategy. This is what he's doing:

Currently, in the *Chicago Sunday Tribune*, Utilities Air Conditioning Co. is using a well-spaced, attention-

getting classified advertisement which calls attention to a window-type room air conditioner available at a special price "because it is a 1948 model."

This type of advertising had led to a steady flow of inquiries, a reasonably good number of sales, and some "stepped up" sales to more expensive models.

Brown is not going to abandon the larger display type of advertisement (of the type shown in the accompanying illustration), but he does not plan to use this type until he is fairly sure the prospects will be getting a touch of hot weather.

FOLLOW-UP ON INQUIRIES

How are prospects from advertising best followed up?

"We follow the general formula of contacting residential prospects by phone, but making personal calls on all commercial prospects," Brown says.

"Actually, there is considerable leeway allowed to the individual salesman's method of approach. For example, I don't like the telephone approach, much preferring to make personal contact, but I know room air conditioners can be sold by telephone, and some salesmen are quite successful at it.

"Also, I don't like to cold canvass. I like to work on leads furnished by users, or on inquiries obtained through advertising. I feel in these cases the prospects are definitely interested in air conditioning and I'm thus using my time to the best possible advantage.

"But I have had salesmen who do very well at cold canvassing, so I know that can be an effective method

*Don't
Simmer
this
Summer*

The new **Carrier**

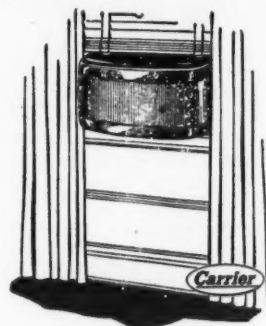
Room Air Conditioners

let you work and sleep

in cool comfort

even on the hottest days!

One of these handsome units transforms your hot, sticky office, living room or bedroom into a zesty seashore cottage. They clean, cool and dry the air like magic and circulate it gently. You enjoy invigorating comfort all summer long. In winter, these Room Air Conditioners ventilate while keeping out rain, snow and wind. Smartly styled in rich walnut, they're at home in any surroundings. They're quiet and economical—easily installed. Three sizes and types—engineered and built by Carrier, the air-conditioning leader. They're ready for delivery. See them today.



Central 9250

Central 9249

UTILITIES AIR CONDITIONING CO.

79 WEST MONROE STREET

CHICAGO'S LARGEST DEALERS IN PORTABLE AIR CONDITIONERS

Here's the kind of display newspaper advertising which James F. Brown of Utilities Air Conditioning Co. has used well in advance of the season in other postwar years. But this year, if he uses such advertising, he'll run it closer to the actual "cooling season."

of selling."

Brown doesn't use much direct mail advertising. He doesn't think it is too effective as a means of getting bona fide inquiries, but believes it might have possibilities in following up prospects who weren't sold on the initial contact.

SELL ON ORIGINAL CONTACT

However, he isn't inclined to chase too much after prospects who don't exhibit much buying interest on initial contact, because it is his theory that "when a man who can afford to buy air conditioning has decided to buy it, he is just about ready to sign the order, and it is pretty much a matter of ironing out the details."

With his users a main source of prospects, Brown realizes that keeping his customers satisfied is a must. Thus, while he farms out his installation work to a service company that specializes in such jobs, he usually

checks the installation himself.

Brown likes to get his jobs installed well in advance of the real hot season, if possible, so that he and his staff can spend most of their time answering calls and keeping users satisfied on minor complaints and adjustments when the "sizzling season" sets in.

M&E
EST. 1866

No ducts required
360° circulation

Built-in pump
Ripple Green
or White

MERCHANT & EVANS CO.
PHILADELPHIA 46, PA.

**COMFORT
COOLER**

Model 100 C.C.
20,750 BTU. hr. at
40° Ref. Temp.
Write For Catalog

**SURE ROUTE
TO BETTER
DRYING**

**BETTER DRYING
BEGINS HERE...**

and

**ENDS HERE WITH
NO PRESSURE
DROP...**

IMPERIAL TORPEDO DRIERS

... designed for faster
more efficient
drying action

- Note generous wrench flats on hexes on both ends.
- Easily refilled on the job—no soldering required.
- Dust-free Silica Gel assures longer operation. No pressure drop—yet no sacrifice of drying capacity.
- One-piece copper shell. Fewer joints—less chance for leakage.
- Copper and brass construction.
- Greater filtering area. Finger-type metallic depth filter is graduated with drier capacity.
- Brazed—no soft solder joints that might loosen.

CAPACITIES—A complete line to meet all refrigeration applications. Capacities rated in accordance with REMA recommendations. All eight sizes—1/6 to 7-1/2 HP... 3 to 75 cu. in.—furnished complete with flare nuts and copper seal caps.

INTERCHANGEABLE CONNECTIONS—30, 50 and 75 cu. in. sizes have female flare threads fitted with male unions. This permits size interchangeability.

See Your Jobber!

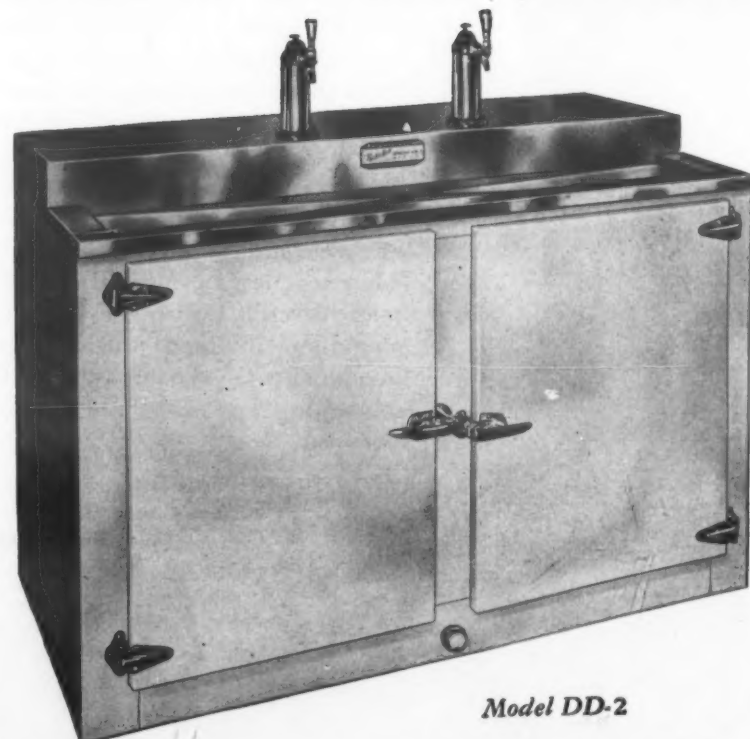
Ask for your copy of Catalog No. 80-A covering the complete IMPERIAL LINE.

THE IMPERIAL BRASS MFG. COMPANY, 534 South Racine Street, Chicago 7, Illinois

IMPERIAL

FITTINGS • VALVES • DRIERS • FILTERS
FLOATS • CHARGING LINES
TOOLS for Cutting, Flaring, Bending, Flare-Off and Swagging

MASTER-BILT DIRECT DRAW CABINET



Model DD-2

Made in 2 and 3 half barrel, remote and self-contained models. Distributors & Dealers write for details.



**MASTER-BILT
REFRIGERATION MFG. CO.**
920 PALM STREET • ST. LOUIS 7, MO.

Frigidaire Air Conditioning

one more reason why the Frigidaire Franchise is so valuable!

Look at the sales opportunity! Wherever people live, work, shop, eat or play—that's your air conditioning market opportunity. It's a tremendous market and Frigidaire now offers the most complete line of air conditioning equipment in Frigidaire's history, and at competitive prices, too.

Look at the quality! For over a quarter century Frigidaire has pioneered and developed many of the outstanding advancements in air conditioning equipment. As a result every product in Frigidaire's complete line is matchlessly engineered—*proved* in performance,

proved in dependability, *proved* in economy.

Look at the factory support! Today Frigidaire dealers are backed by record advertising campaigns on air conditioning in national and trade magazines. And Frigidaire offers the kind of aggressive merchandising program it takes to get results—cooperative newspaper advertising, telephone directory listings, air conditioner window displays, literature and direct mail.

All this adds up to a major profit opportunity for Frigidaire dealers—one of the many opportunities that make a Frigidaire franchise so valuable.



New Room Air Conditioners at New Low Prices!



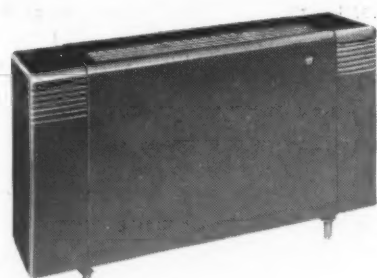
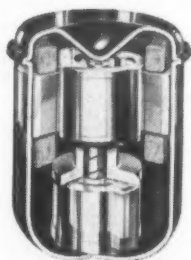
Frigidaire announces two new window-type room air conditioners which really fill the bill for the great market potential in homes, business and professional offices, hotels and hospitals. Both smartly designed and finished in beautiful metallic gray. Both powered by the quiet, smooth-performing Meter-Miser, providing complete summer air conditioning service. Both offered at new low prices.

New ½ H.P. model ARL-50, easily installed in most windows, may be plugged into the ordinary electrical outlet for 115 Volt, 60 Cycle, Single phase current. This efficient model air conditions small-to-medium-size rooms.

New 1 H.P. model ARL-100 offers *selective cooling* with double Meter-Miser units. And, Frigidaire builds the only 1 H.P. window-type room air conditioner in the industry. Another Frigidaire exclusive.



The **Meter-Miser**—the simplest refrigerating mechanism ever built—powers these two new window-type room air conditioners. It's the same quiet, dependable Meter-Miser that powers America's No. 1 Refrigerator—Frigidaire. And it's backed by a special 5-year warranty.



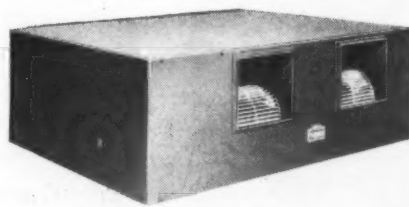
Two 1-ton floor-type models are offered for use with remote compressors. These are especially suitable for single or multiple installations where window units cannot be used. Model AC-100R is for cooling, while model ACH-100R has both cooling and heating coils for year-round use.

Store Air Conditioners from 3 to 10 Ton Capacities!

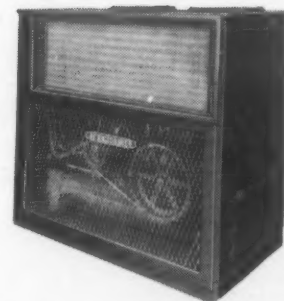
Frigidaire "packaged" air conditioners can be installed almost anywhere in just a few hours. Two-tone brown finish blends with any surroundings. Compact, rigid steel construction. Easily adjustable grilles can be turned to deliver air where desired. Replaceable filters are conveniently located behind incoming air grille. And special, thick insulation keeps noise inside—prevents moisture from forming outside.

Important, too, every part of the air conditioning mechanism is designed and built by Frigidaire. The famous Frigidaire Multipath Cooling Unit, compressor and controls are precision matched—to work together like a championship team—to give years and years of low-cost, trouble-free service.

Three-ton model SC-304 Frigidaire Store Air Conditioner illustrated.

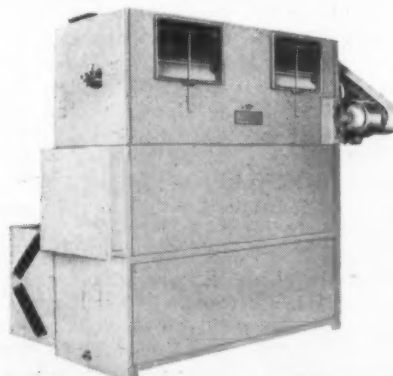


Compact suspended-type air conditioners save valuable floor space! May be installed singly or in multiple. Models are available for use with "Freon 12" or chilled water. Heating coils available for winter use.

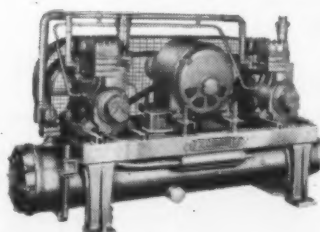


New, heavy duty, 10 ton, self-contained Air Conditioner for use with ducts. Heating coils available. Model SC-1001 is designed for use with city water or water tower. Model SCE-1001 is for use with an evaporative condenser.

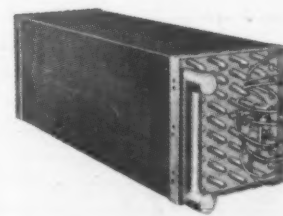
COMPLETE LINE OF CENTRAL SYSTEM EQUIPMENT FOR CUSTOM-BUILT INSTALLATIONS!



Vertical and Horizontal Central System Air Conditioners are available in a wide range of capacities from 9 to 24 tons. The horizontal units are designed for suspension from the ceiling in buildings where space is at a premium. Many accessories are available, including dual steam distributor tube heating coils and humidifier assembly for winter use.



Frigidaire Heavy Duty Compressors are available in a wide variety of sizes up to 25 H. P., including models for use with water tower and evaporative condensers. They're designed for perfectly balanced operation with Frigidaire controls and cooling units. Frigidaire compressors are famous for dependability, for low cost operation and maintenance.

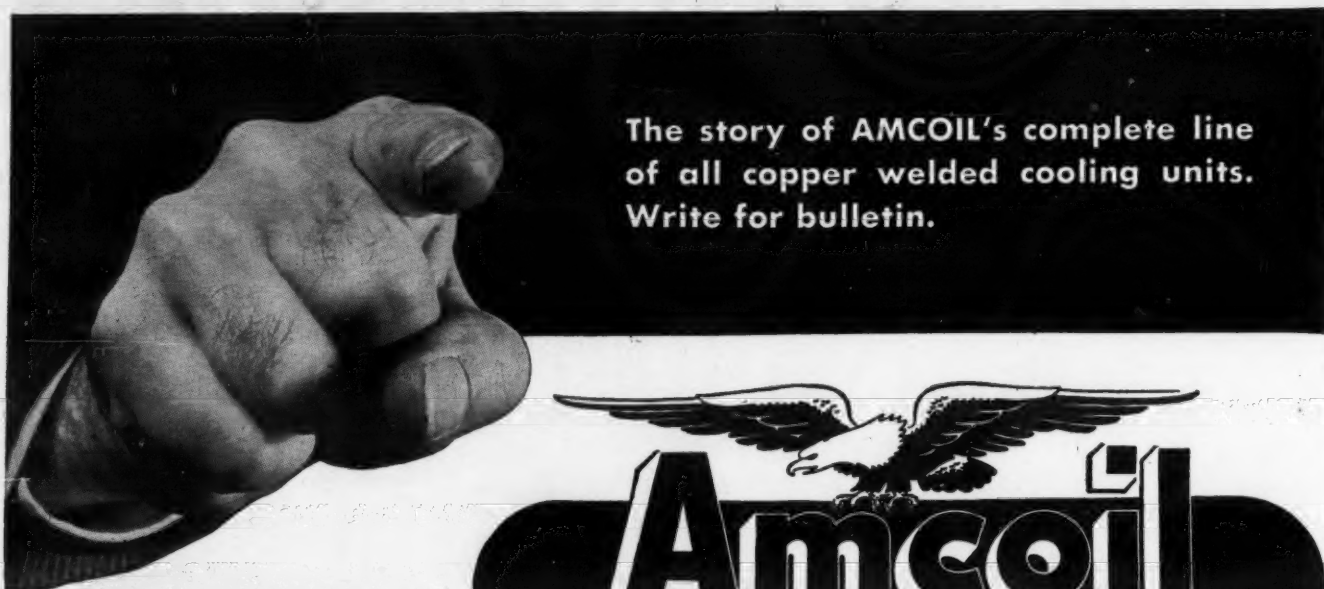


Multipath Cooling Units, exclusive with Frigidaire, scientifically meter the flow of refrigerant to all parts of the unit, assuring even temperature throughout the coil. Staggered tubes and counter-flow cooling action assure swift, complete heat transfer. Efficient Frigidaire Multipath Cooling Units are available in a wide variety of sizes for custom-built installations.

Depend on FRIGIDAIRE to do things right!



Have you heard...



The story of AMCOIL's complete line of all copper welded cooling units. Write for bulletin.

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REFRIGERATION • AIR CONDITIONING • HEATING

AMERICAN COILS COMPANY, 360 THOMAS ST., NEWARK 5, N. J.

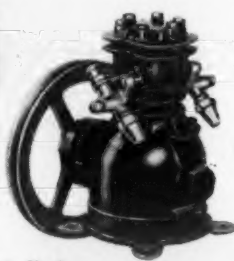
THE MASTER SERVICE MANUALS - - -

— — — and other books of the Refrigeration Library are depended upon as textbooks in trade schools from coast to coast.

BUSINESS NEWS PUBLISHING CO., DETROIT



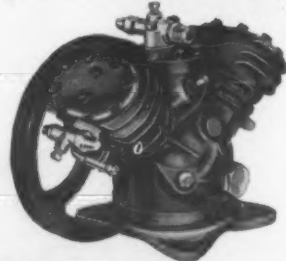
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COMPRESSORS



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Chieftain 4"

Your best bet for replacement installations... reliable Chieftain Compressors! They're smooth, quiet, dependable in operation... designed and built to provide the maximum in long-life, trouble-free performance at minimum first cost.

☆ Precision machined throughout. ☆ Forced feed lubrication for reciprocating parts. ☆ Automatic cylinder lubrication. ☆ Triple inspection and careful selective fitting of all parts. ☆ Available in single, twin, and four cylinder models to meet requirements of a wide range of commercial applications.

COMPRESSOR DATA

| Model No. | Bore | Stroke | Cylinders | Cubic Inch Displacement | Flywheel O.D. in. | Shut-Off Valve | | Oil Charge | Net Weight | Shipping Weight |
|-----------|--------|--------|-----------|-------------------------|-------------------|----------------|-----------|------------|------------|-----------------|
| | | | | | | Suction | Discharge | | | |
| 500A | 1 1/8" | 1 1/4" | 1 | 2.33 | 8 1/2" | 3/4" | 3/4" | 12 oz. | 30 | 32 |
| 1300 | 1 1/4" | 1 1/4" | 1 | 1.53 | 8 1/2" | 3/4" | 3/4" | 12 oz. | 30 | 32 |
| 1000A | 1 1/8" | 1 1/4" | 2 | 4.66 | 9 1/2" | 3/4" | 3/4" | 18 oz. | 37 | 39 |
| 1400 | 1 1/4" | 1 1/4" | 2 | 3.06 | 9 1/2" | 3/4" | 3/4" | 18 oz. | 37 | 39 |
| 2300 | 1 1/2" | 1 1/4" | 2 | 5.06 | 9 1/2" | 3/4" | 3/4" | 18 oz. | 37 | 39 |
| 1200 | 1 1/8" | 1 1/4" | 4 | 9.32 | 11" | 3/4" | 3/4" | 24 oz. | 63 | 78 |
| 1800 | 1 1/2" | 1 1/4" | 4 | 10.12 | 11" | 3/4" | 3/4" | 24 oz. | 63 | 78 |

DIMENSIONS

| Model | A | B | C | D | E | F | G | H | I |
|-------|------------|--------|----|--------|---------|---------|--------|---------|---------|
| 500 | 1 1/8" Sq. | 5" | 5" | 1 1/4" | 9 1/2" | 11 1/4" | 2 1/2" | 7 1/2" | 8 1/2" |
| 1300 | 1 1/8" Sq. | 5" | 5" | 1 1/4" | 9 1/2" | 11 1/4" | 2 1/2" | 7 1/2" | 8 1/2" |
| 1000 | 1 1/8" Sq. | 5" | 5" | 2 3/4" | 9 1/2" | 12 1/4" | 2 1/2" | 7 1/2" | 10 1/2" |
| 1400 | 1 1/8" Sq. | 5" | 5" | 2 3/4" | 9 1/2" | 12 1/4" | 2 1/2" | 7 1/2" | 10 1/2" |
| 2300 | 1 1/8" Sq. | 5" | 5" | 2 3/4" | 9 1/2" | 12 1/4" | 2 1/2" | 8 1/2" | 10 1/2" |
| 1200 | 1 1/8" D. | 5 3/4" | 7" | 2 3/4" | 11 1/2" | 13 1/2" | 3 1/4" | 14 3/4" | 10 1/2" |
| 1800 | 1 1/8" D. | 5 3/4" | 7" | 2 3/4" | 11 1/2" | 13 1/2" | 3 1/4" | 14 3/4" | 10 1/2" |

TECUMSEH PRODUCTS COMPANY

Tecumseh, Michigan

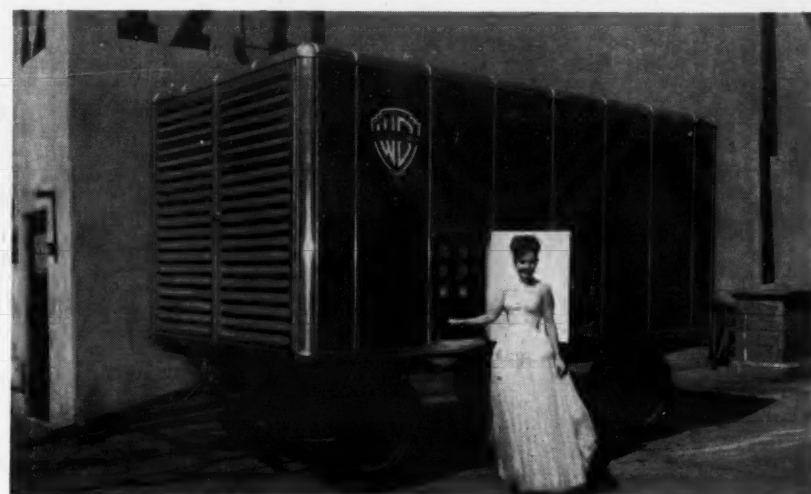
EXPORT DEPARTMENT • 2111 Woodward Avenue • Detroit 1, Michigan

WORLD'S LARGEST INDEPENDENT PRODUCER OF COMPRESSORS AND CONDENSING UNITS FOR THE REFRIGERATION INDUSTRY



Chieftain

A Lifesaver for the Stars



(ABOVE) Joyce Reynolds, Warner Bros. starlet, poses beside one of the mobile air conditioning units that provide relief from excessive floodlight heat on color movie sets.



(RIGHT) J. F. Reardon of C. G. Hokanson Co. inspects the interior of a mobile unit.

Mobile Air Conditioners Cool Movie Sets, 3 Million Cu.Ft. Pan Pacific Exposition Hall

LOS ANGELES — When Warner Brothers Studio in Hollywood used color film in making "Life With Father" the heat generated from the excessive amount of light needed to shoot color film caused delays necessitated by the actors and actresses taking time out to cool off.

A hurry call went out to C. G. Hokanson Co. to provide some sort of air conditioned relief. Within 24 hours C. G. came up with the forerunner of his now streamlined Mobile Air Conditioners. The prototype was sufficiently satisfactory to warrant Warner Brothers Studio ordering several of them.

At the All Electrical Exposition held in the huge Pan Pacific Auditorium in Los Angeles (3 million cu. ft. of volume) four of these Mobile units provided air conditioning to the place for the first time in its history.

Mounted on 8-Wheel Trailer

The over-all dimensions of the aluminum clad unit are: 14 ft. long, 8 ft. wide, and 11 ft. 6 in. high. It is mounted on an 8-wheel trailer of four ton capacity.

The equipment in the Mobile Air Conditioner unit is as follows: permanent viscous air filters to clean the air, a 30-hp. General Electric CM104K refrigerating compressor, a panel board complete with circuit breakers and all control wiring neatly enclosed; direct expansion General Electric copper cooling coils which cool the air as it passes between the fins of the coils.

The refrigerant piping contains vibration eliminators, electric solenoid valves, and liquid strainer.

Condensing unit is supported on rubber vibration mountings that are snubbed down when the unit is moved. A squirrel cage blower propels 17,000 c.f.m. on high speed of the blower motor and about 10,000 c.f.m. on low speed. The two-speed blower motor is 5 hp./2 1/2 hp. with 1,800/900 r.p.m. respectively. The interior of the aluminum housing is insulated for temperature conduction and sound absorption.

The unit has several very desirable operating features. All water and electrical connections are accessible from the exterior making connections easy. Control of operation of the unit is from an exterior panel on the side of the unit and the panel lights up whenever electric current is connected to the unit.

This panel shows both high and low refrigerant pressures with four

thermometers indicating (1) condenser water in, (2) condenser water out, (3) air in, (4) cooled air out. These temperatures readily indicate how the operation is going. A switch with pilot light shows high speed or low speed operation of the fan, and a second switch controls the refrigerant compressor.

Another interesting operating feature are the dampers. There are horizontal and vertical dampers electrically operated and controlled from the exterior panel. There are two pointers on a scale of 0 to 100 which indicate the percentage of movement of the dampers controlled by electric motors. The dampers direct the flow of air on the blower discharge and can be directed wherever the operator wishes by manipulation of the pointers on the panel.

Horizontal deflection varies from 45° in either direction from the front of the unit. The vertical dampers can direct the air from 45° above the vertical or can be lowered to a completely closed position.

Has 30-Ton Capacity

The Mobile unit has nominal capacity of 30 tons of refrigeration and 17,000 c.f.m. air handling with peak loads in excess of 30 tons. Water consumption is approximately 45 gallons per minute while electric power consumption is 28 kw./hr.

The Pan Pacific Auditorium installation necessitated some out of the ordinary hookups to get the units running. There was not sufficient 220 volt power to operate the four Mobile units strategically placed in the building, but there was ample 440-volt power.

In order to get the units operating it was necessary to run two services to each Mobile unit. 440-volt power was supplied to the motors and 220-volt power was supplied to the electrical panel of the unit, which in turn supplied the blower motor as well as all electrical controls.

Water was supplied through 1 in. hoses 50 ft. long at 125 p.s.i. The water was discharged into a tremendous storage tank under the floor of the auditorium.

The moisture removed by refrigerating the air was a different problem as some spots of the auditorium were without gravity drains. To overcome this difficulty, 50-gal. capacity drums were obtained and the condensate was drained into them. Then an operator on continuous duty would bail the water out and take it to the nearest drain.

DEALERS!

This Display Puts You Into the ROOM AIR CONDITIONING Business!



ROOM AIR CONDITIONING "MERCHANDISER"

Here's the display that creates a complete Room Air Conditioning department in your store! Takes up only a few square feet; on wheels for easy moving; sturdy wood and Masonite construction. Sells for you 4 ways: 1. Keeps the unit in constant display on your floor. 2. Shows how the unit actually looks in a window. 3. Enables you to demonstrate the unit so your customer can actually feel the cold air delivery. 4. Tells the selling story to the unattended customer.

Everyone who walks into your store is a prospect for a Room Air Conditioner. And the MITCHELL "Merchandiser" prominently displayed on your floor *sells them!* Just one look and they're interested. Just one simple demonstration and they're sold on MITCHELL Room Air Conditioning.

You'll sell the MITCHELL Room Air Conditioner like any major appliance package. Just two models handle all types of rooms. Each is a complete package—installs easily in any window—plugs in like a radio—no plumbing connections required.

Your market is unlimited. Every home, office and institution in your community is a prospect. We'll show you how to get into this profitable business easily, quickly, with minimum outlay. Send coupon today and learn how easy it is to sell MITCHELL Room Air Conditioners with the action-producing "Merchandiser" and Selling Plan. Act Now!

MITCHELL 1/2 TON AND 3/4 TON ROOM AIR CONDITIONERS

- ★ **GREATEST COOLING CAPACITY** of any 1/2 ton and 3/4 ton units on the market is established by tests made by United States Testing Company in accordance with applicable standards published by American Society of Refrigeration Engineers. Each unit carries MITCHELL'S 5-YEAR WARRANTY.
- ★ **LOWEST PRICE**—the most competitive units on the market today. You get every selling edge, price-wise and quality-wise.
- ★ **EASIEST TO SELL**—no special experience, no engineering organization necessary. You sell a package unit and a package installation. And what a package! No trade-in headaches—no heavy competition in this new business. The unit of sale is high and you make a full profit.
- ★ **MORE SELLING AIDS.** MITCHELL backs you to the limit with every type of selling aid—mailing and counter folders, window streamers, newspaper mats and extensive national advertising—everything you could ask for to help you sell easier and more profitably.

GET INTO THIS PROFITABLE BUSINESS!

MAIL
COUPON
NOW

MITCHELL MANUFACTURING COMPANY
Air Conditioning Division
2525 N. Clybourn Ave., Chicago 14, Illinois

Show me how I can get into the Room Air Conditioning business with the MITCHELL "Merchandiser" and Simplified Selling Plan. Send details to my personal attention.

NAME

TITLE

COMPANY

ADDRESS

CITY ZONE STATE

MITCHELL

AIR CONDITIONING DIVISION
MITCHELL
MANUFACTURING COMPANY
CHICAGO 14, ILLINOIS

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REFRIGERATION SERVICE, INC.
West Coast Wholesaler since 1928
3109 Beverly Blvd., Los Angeles 4, EX. 3111

Photos of Previous Jobs Help Dealer Sell Wealthy Home-Owner On Installing Air Conditioning

JEFFERSON CITY, Mo.—Regularly taking 8 x 10-in. photographs of beautifully-designed home air conditioning installations and incorporating them into albums is a merchandising asset which has helped Woodman Engineering Co., Carrier dealer here, to sell a long list of estate-home and commercial air conditioning systems.

Offering domestic and commercial refrigeration service, air conditioning from package units to 50-ton multiple jobs, radiant and forced air heating, the Woodman concern is one of central Missouri's most versatile refrigeration sales and service organizations.

L. E. Woodman, head of the firm, is a licensed air conditioning and heating engineer, and has sold most of his large-scale contracts himself,

including banks, hospitals, shoe factories, and most unusual, air conditioning up to 30 tons for large estate homes of central Missouri millionaires.

He came to Jefferson City, the state capital, in 1932, shortly after obtaining his first Carrier franchise. Recognizing the somewhat-limited sales field for air conditioning at that time, Woodman quickly "diversified" his organization, setting up a domestic and commercial refrigeration service plant, that covered a territory extending 60 miles around Jefferson City.

Along with this department, he added a complete line of major appliances, and a commercial refrigeration division, the latter covering the whole field of food stores, locker plants, and specialized refrigeration.

Ads Built Around Slogan

Finally, the showroom included automatic heating equipment of all types. All of these lines, Woodman feels, are necessary to back up the firm's heavily advertised slogan of "Your Comfort Is Our Business."

The appliance department was discontinued after four years when heating and air conditioning sales required too much time, but was resumed following the end of the war, and is now one of Jefferson City's largest, carrying the complete Hotpoint line, package air conditioners, and package electric kitchens.

With a prominent downtown location, the Carrier dealer has built up a sales volume which amounted to more than \$200,000 last year, split almost equally between air conditioning, heating, and appliances, with service and commercial sales contributing as well.

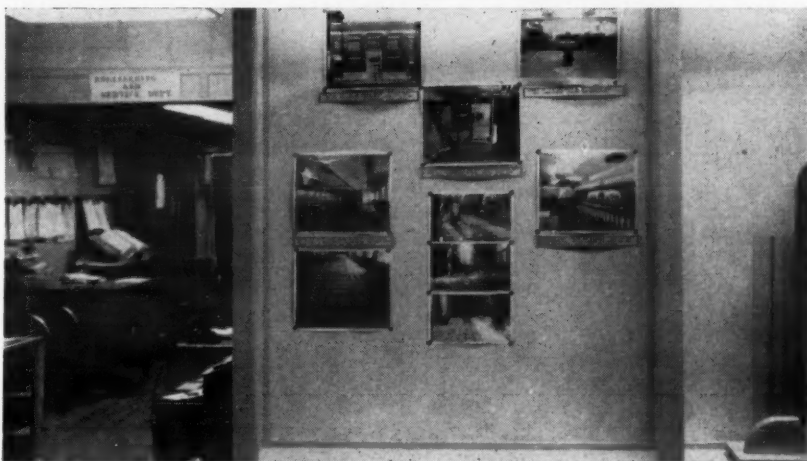
The showroom is divided into two sections, with the appliance department, under a manager and two salesmen, at the left, and the air conditioning-heating equipment display at the right.

Cutout silhouette letters across the rear of this showroom read "Your Comfort Is Our Business" while below on the wall is a fluorescent lighted panel on which Woodman shows from six to 10 photos of outstanding installations the firm has made.

Everything from Appliances to Zone Cooling



One section of Woodman Engineering Co.'s showroom where the display of home appliances, air conditioners, and commercial units enabled this dealer to achieve a volume of over \$200,000 during 1948.



Close-up shows how photographs of previous jobs are exhibited directly behind counter area where customers can see them.

These 8 x 10-in. pictures, which are made on every heating or conditioning project, get a lot of attention. In fact, they helped to sell a wealthy customer who came in to buy a refrigerator on a 15-ton air conditioning plant for his country home.

While each department fits in neatly with the others, Woodman Engineering Co. concentrates on air conditioning, due to a rapidly increasing market here.

During past years, Woodman has installed complete systems in several banks, a huge drugstore, osteopathic hospital, offices, and manufacturing rooms of a shoe factory, bars, business buildings, and restaurants.

Contacts Often Sell 2 Jobs

All of these are "big jobs," but the firm is equally aggressive in merchandising smaller package systems for retail stores, shops, and professional offices. Many of them combine heating and refrigeration.

Two years ago Woodman Engineering Co. added radiant heating to its lineup, and has already installed several large systems which have attracted much publicity.

Woodman has to date installed six large central air conditioning systems in country homes, ranging from five tons to 30 tons, most involving heating as well.

Some of his home air conditioning systems are "zoned" with two or more Carrier Weathermaker units cooling separate floors. Every installation is painted in silver or other colors to match the basements of the estates, and make eye-appealing photographs when completed.

Lush Domestic Field Seen

Success in large-scale home air conditioning has convinced Woodman that this is one of his most important future fields, and he is concentrating on promotion of package and larger air conditioning systems in the prosperous farming communities surrounding Jefferson City.

All of the company's services are carried out by a seven man crew who can handle refrigeration, air conditioning, repair service, heating installation, etc., when called upon (except for steamfitters called in for

radiant heating jobs).

Woodman pays his men far above average rates, and requires each to attend intensive training classes held in the showroom, during which everything from appliance repairs to engineering of big conditioning systems is taught. Out on refrigeration service calls, the men regularly turn in leads for heating and air conditioning sales.

Woodman Engineering Co. is a heavy advertiser in its territory, using newspaper display advertisements, and radio spots to remind the public of its many services.

In addition, direct mail is heavily used.

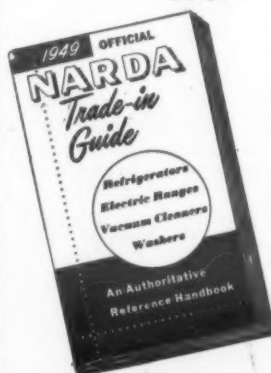
"We pick out a logical prospect for air conditioning, for example," Woodman grinned, "and keep after him for years if necessary, with folders and literature until he eventually calls us in."

5 Kellys Charter Contracting

Business In Grand Island, Neb.

GRAND ISLAND, Neb.—Kelly Supply Co. has taken out a Nebraska charter, with \$75,000 capitalization, to install and service air conditioning, heating, and plumbing equipment. Incorporators are Martin J., Elva M., Howard V., Ralph D., and Martin J. Kelly, Jr., all of Grand Island.

A money maker for you in 1949



**ORDER
YOUR
COPIES
TODAY!**

Official NARDA Trade-in Guide Four Guides in One

Covers refrigerators, electric ranges, vacuum cleaners and washers. Trade-ins will be a big factor in your 1949 business. With the official NARDA Trade-in Guide you can meet trade-in problems with confidence and profit. Order now, get your copy at once.

1 to 5 copies \$5.00 each
6 to 25 copies 4.00 each

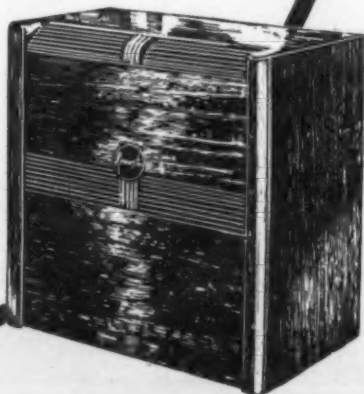
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**Specify
DAVISON PA 100**
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dryers bearing
this label or in bulk for refilling
PA 100 is your guarantee of all-around, superior performance
SEE YOUR JOBBER



Only Remington has them all!

Only Remington has a ROOM AIR CONDITIONER for every need.

Don't be compelled to lose jobs for lack of the unit you need. Don't... if you are building for the future... undersize a job for lack of the model it needs. Instead, sell the most complete line. Sell the most salable line. Sell Remington... the only line that "has them all."

- | | |
|-------------------------------|-----------------------------------|
| ✓ ½ hp. window units | ✓ 1½ hp. water-cooled consoles |
| ✓ ¾ hp. window units | ✓ Units for DC as well as AC |
| ✓ 1¼ hp. air-cooled consoles | ✓ Units for remote installation |
| ✓ 1¾ hp. air-cooled consoles | ✓ Units that heat as well as cool |
| ✓ 1 hp. water-cooled consoles | |

SEND NOW FOR BOOKLET G-2.

REMINGTON
Air Conditioning Division
CORTLAND, NEW YORK

Hotpoint Ad Drive To Bid for Patrons Awaiting Low Prices

CHICAGO—"Quality at prices you've been waiting for" is the theme of a series of factory paid newspaper advertisements which Hotpoint, Inc. launched recently in 95 key cities throughout the country, Leonard C. Truesdell, vice president of marketing, announced.

The initial advertisements, first of a large key city advertising program for 1949, "sell hard on price and quality" and tell consumers: "Don't wait. The low prices you've been waiting for are here now."

In a bulletin to the company's field organization and distributors, Truesdell said:

"During the past few weeks we've watched an avalanche of the price-slashing type of advertising make its appearance in countless markets throughout the country. We've also carefully and thoroughly examined the market attitude which is presumed to have indicated the need for such advertising.

"It is our considered judgment that the 'Was ... Now Reduced to' advertising failed to accurately gauge the temper and disposition of the market, because instead of inducing widespread consumer buying interest, it further thwarted and delayed that interest on the premise that it was good strategy to wait for further cuts.

"We have no illusions about the fact that today's market has toughened up considerably, but neither do we have any illusions about the fact that aggressive, two-fisted selling and promotion will produce sales at a profit."

The 1,820-line advertisements will prominently feature the company's new low-price electric range with a suggested retail price of \$179.95. The full-size range has a deepwell cooker and greater cooking capacity made possible by improved oven and surface units.

The advertisements also will display a table-top water heater as well as a low-cost refrigerator and automatic dishwasher.

Truesdell said that distributors are being supplied with factory-prepared mats for local tie-ins by means of multiple dealer advertisements. Most distributors already have set up an advertising program for 1949 to supplement factory-paid promotion of household lines.

The advertisements are timed to give dealers strong selling support at the approach of the peak season for major household appliances, Truesdell said.

Mellem Named Engineer In G-E Range, Water Heater Division

BRIDGEPORT, Conn.—Lewis R. Mellem has been appointed acting commercial engineer of the General Electric range and water heater division, J. R. Poteat, division manager, has announced.

A graduate of Iowa State college, Mellem joined the company in 1946. He was most recently assistant to the commercial engineer of the range and water heater divisions.

Promoting Intangibles:

'Customer Confidence', Dealer Finds, Often Can Prove Key to Future Sales

TORONTO, Ont., Can.—"Fancy words or fancy fixtures do not make good friends or loyal customers."

So declared Home Appliance & Radio Co., Ltd., here, in a newspaper advertisement designed to stress the importance of a customer's confidence in the place with which he does business.

The advertisement was headed by the caption: "A Very Important Message." Copy read:

"Any merchant, worth his salt, must offer you more than merchandise to merit your patronage. The confidence you place in what a merchant tells you counts more than the price ticket attached to what you buy. If you can't buy with confidence, don't buy."

The advertisement went on to plug the store's four specialized service

departments, under the sub-heading: "Toronto's leading repair experts will make your household appliances and radios in brand new condition." Departments were described as follows:

"Washing Machine Department: Complete stock of parts to service or completely overhaul any make of washing machine like factory precision."

"Vacuum Cleaner Department: Repairs to any make of vacuum cleaners, including rebuilding upright or tank models by factory-trained experts."

"Small Appliance Department and Electric Ranges: Parts on hand to repair your electric small appliances of every description."

"Radio Service Department: Our skilled technicians will repair any make."

Price Protection Set On Speed Queen Line

RIPON, Wis.—Barlow & Seelig Mfg. Co. here has announced a price protection policy for dealers and distributors of Speed Queen washers and ironers, guaranteeing them against any decrease being made in wholesale price for the remainder of the year.

The policy is intended to allay the retailer's "normal fear of being caught with heavy inventory should a price decrease occur," according to a statement made by R. P. James, sales manager.

Brothers, Inc. Spends \$20,000 Opening 2nd New Bedford Branch

NEW BEDFORD, Mass.—A second \$20,000 branch of Brothers, Inc., has been opened here. Under management of Benjamin Estner, the store carries Gibson, Monitor, and Frostaire appliances and will soon add G-E refrigeration to its full line of G-E appliances.

Weekly Window Feature Helps Sales by Rousing Curiosity

SAN ANTONIO, Tex.—An "appliance feature of the week" is emphasized in the curving front windows of the new \$35,000 appliance store recently completed here by Paul Tarrillion, veteran appliance dealer.

The "all-glass" store, which is completely air conditioned with a 20-ton, two-stage system, has 21 backless windows around three sides.

Each week, a different appliance is featured in the windows. Displays include life-size manikins and numerous "selling signs" to give on-lookers adequate information on the use of the appliance. Refrigerators and home freezers are stocked with food.

The "feature of the week" can readily be seen, day and night, from two heavily-traveled streets. Weekly sales are invariably heaviest in the appliance featured in the windows, Tarrillion reported.

*Sell all types
of difficult prospects*

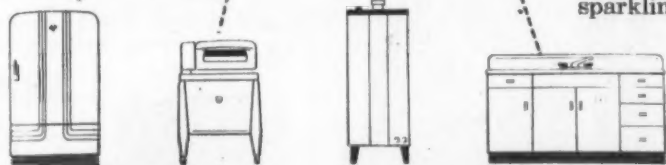


THE SHY TYPE



USE THE DU PONT SEAL
TO CLOSE THE DEAL

It identifies America's
leading home appliance finish!



She's likely to fly away if you use the wrong sales approach. What she wants is helpful information in a quiet, friendly manner. And the best way to tell her about the finish is by pointing to the Du Pont "Dulux" seal!

With a majority of prospects, the "Dulux" seal wins instant recognition and reassurance. From past performance they know it stands for years of washable, mar-resistant service ... sparkling good looks. All you have to

mention is that the finish is "Dulux," made by Du Pont.

If your manufacturer supplies you "Dulux"-finished appliances without the seal, ask him to include it in the future. It helps you build a quality story that wins more sales from difficult prospects!

HERE'S SELLING MADE EASIER: Free new informative booklet gives you profitable "selling points" for appliances finished with "Dulux." Send coupon today for your copy.

E. I. du Pont de Nemours & Co. (Inc.)
Finishes Division, Dept. A.C.-94
Wilmington 98, Delaware
Please send, free of charge, your new illustrated booklet, "Inside Information on the Outside."

Name _____ Title _____
Firm _____
Address _____
City _____ State _____

delivered and installed,
plus 5 year warranty
and food protection!

6 CUBIC FOOT FREEZER
\$199⁵⁰

With full mark-up
for Distributors
and Dealers.
Write or Wire
NOW!

MODEL 60

another first for
Amana
REFRIGERATION DIVISION
Amana Society • Amana 14, Iowa

'Package' Air Conditioners Open New Market In Theater Cooling Field

Radner Explains How Market Was Analyzed and Tells of First Installations In Detroit Area

By Phil B. Redeker

DETROIT—The man who developed the application of "packaged" type air conditioners to theaters here didn't just stumble onto this choice, unworked market by accident.

The story is one of intelligent consideration of market possibilities for packaged air conditioners, and the development of sales in the particular market selected in face of many difficulties, including industry tradition against doing theater air conditioning in such a manner.

Five Detroit theaters were air conditioned in this manner during 1948, and a considerable number more are likely to get "packaged" cooling this year. Furthermore, the installations made thus far have aroused nationwide interest not only in the air conditioning industry, but among motion picture and theater operators. "Packaged" air conditioning, where the application will fit, seems to offer the advantages of lower first and operating costs, and speedy installation with a minimum of renovation.

Leonard L. Radner is the man who pioneered these jobs in Detroit last year. Educated as a lawyer, but with most of his business experience in the heating field prior to the War, Radner served in the Army and wasn't discharged until 1946. When he got

out, he decided he wanted to find a field that seemed to offer some maximum opportunities, so he decided to concentrate on the comfort cooling part of the air conditioning field.

By 1948 he had formed his own company, originally known as Northern Cooling & Heating Corp., but now changed to Theater Air Conditioning Corp.

"I analyzed the situation and realized that if I stuck to the conventional type of prospect for air conditioning I'd just be another participant in an already crowded fight for a share of a certain piece of business," Radner explained. "So, I decided to look around and see if there wasn't a market that wasn't being rushed by all my competitors."

"The theater field, from what I could learn, wasn't being worked. I tried to find out why."

"There seemed to be three main reasons. First, it seemed to be firmly fixed in the minds of both the air conditioning contractors and the people that theaters could only be air conditioned with large, central-station type systems using ductwork. Secondly, most theater owners—particularly those in the smaller-size group—were convinced that it was too costly. Thirdly, during the War

and in the immediate postwar-boom, things were so good for theater owners that they saw no need for such improvements as air conditioning."

A survey of his market revealed that of the 225 movie houses in the Detroit area, 160 were not air conditioned. Further investigations into the nature and ways of the movie theater business enabled Radner to divide up the market, for his purposes, into three rough classifications of houses:

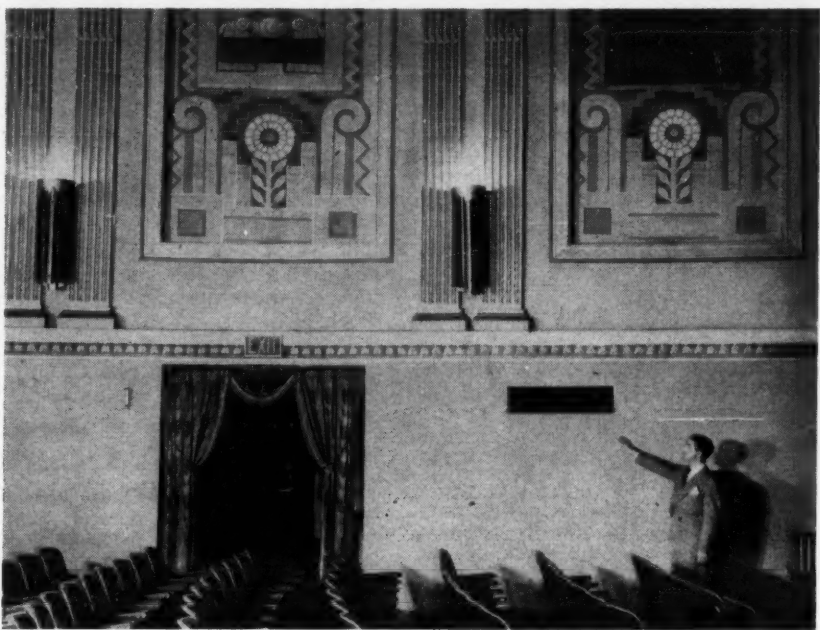
1. 1,500 seats and over.
2. 700 to 1,500 seats.
3. Under 700 seats.

The "big fellows" Radner reasoned, wouldn't be too susceptible. They would tend to hold with tradition, and with some exceptions, their needs in the air conditioning line could probably best be met with a central-station type system.

The "in-betweeners," with 700 to 1,500 seats, were definite possibilities, but Radner found that they often aped the thinking and policies of the larger houses.

So, it was on the "little fellows" that he decided to concentrate. He spent months contacting theater owners—mostly the "little fellows" but also some "in-betweeners," before he finally broke through to a sale. And when he did, it was to an "in-betweener," the National Theater, which is a 1,000-seat house. The National Theater is part of the Korman Theater chain.

1,500-Seat Theater Cooled by Packaged Units



Where the design and construction of the theater is such to permit it, packaged air conditioners can be recessed behind the walls so that only the outlet grilles show. Here Leonard Radner of Theater Air Conditioning Corp. points to one such outlet grille for a packaged unit in the Tuxedo theater, 1,500-seat Detroit theater. High above the exit doorway is another such outlet.

In a couple of ways, this was a break for Radner. The National was not only a fairly good-sized house, it was a "24-hour" theater, open all day and night. There are a number of these all-night theaters in Detroit, for the simple reason that Detroit lives up to its title of "the city that never sleeps," a three-shift industrial city where one is likely to find more traffic around midnight, as the shifts change, than at high noon.

With this installation Radner had a real story to take to other theater owners. If packaged air conditioners would work in a 1,000 seat house open 24 hours a day, surely a similar system could handle the loads built up in smaller or comparable size houses open 12 hours at the most.

Furthermore, Radner's firm did the job at the National theater with 42 tons of refrigeration (6 package conditioners) at a cost of less than \$13,000. The best estimate the owner

had got on a central-station system was around \$30,000.

Some of the theater operators who were getting worried over declining summer box office receipts became interested. Radner installed air conditioning in the Chic (475 seats) the Carver (550 seats), the Apollo (625 seats), also Korman owned, and climaxed it with a late summer installation in the Tuxedo, (Wisper & Wetsman theater) a 1,500-seat house with a balcony, which could be properly classified as a "big fellow."

But how, you may ask, did Radner get in to make the installation at the Tuxedo in the summer?

The installation was made in four days, working in the daytime only (the Tuxedo is open only at night during the week). And therein lies another sales point for packaged air conditioning for theaters—the brief installation time required.

(Concluded on next page)

Precision Performance is in the palm of your hand

with PEERLESS Expansion Valves!

TXV Peerless Thermal Expansion Valves are compact, precision-made instruments expertly engineered to provide the most perfect refrigerant control obtainable. Order TXV-F for Freon, TXV-M for Methyl. Use these semi-pressure-limiting valves on any temperature application — high or low. The new super-vapor charge provides constant bulb control. For superheat adjustment simply slide the variable contact bulb up or down on horizontal suction line. Peerless TXV's give matchless performance and have long life.

AXV Peerless Automatic Expansion Valves are your surest means of trouble-free operation at peak of efficiency wherever a valve of automatic type is applicable. Actuated by variations in coil pressure, this valve closes tightly when compressor stops, reopens only when evaporator pressure descends to point for which the valve is adjusted. Recommended for use on all small, single evaporators, up to ½ ton capacity, Methyl, Freon or Sulphur Dioxide.

Send for Circulars Giving Details and Prices

PEERLESS of AMERICA, Inc.
2901 Lawrence Ave. Chicago 25, Illinois, U.S.A.

How Units Cool a Big Theater Balcony



To cool the balcony of the Tuxedo theater, two packaged conditioners have been installed, one on either side of the projection booth. Air is deflected downward from the outlet.

TEMP-CONTROL'S FULL LINE Means MORE SALES For You!

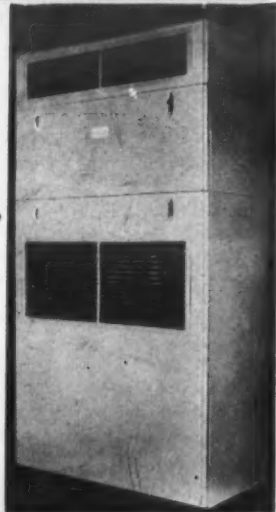
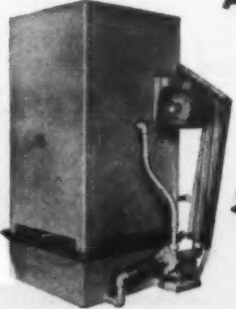
Your market is larger when you carry the Temp-Control Full Line. You can now answer your customer's every requirement with Temp-Control's Hi-Boys, Lo-Boys, Evaporative Condensers, Low-Sides, etc. Each packaged Hi-Boy is sold complete—no extras. Simple to install. Every unit acoustically lined to insure quiet performance.

AVAILABLE NOW

- 3, 5, 7½ and 10 ton Hi-Boys.
- Packaged units for Duct Installation
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Evaporative condensers 3 to 100 tons. Cuts water consumption by 95%.

DEALERS: A Profitable Temp-Control franchise is available for you now. WRITE TODAY.



Temp-Control Inc.
A FINE NAME IN AIR CONDITIONING

PEORIA
ILLINOIS

'Package' Units In the Theater Cooling Field--

(Concluded from preceding page)

What are some of the technical considerations involved in the installation of packaged air conditioners for theaters, from the standpoint of both theory and experience?

From the jobs that Radner's firm has done, the installation and operating setup works out something like this:

Conditioned air is discharged out on a straight plane at 7½ ft. from the floor. Hot air is pushed up ceilingwards, and the conditioned area is maintained under pressure below the 7½-ft. level.

No special provision is necessary for the introduction of fresh air, it is said. The opening and closing of the front doors of the theater allows sufficient infiltration of outside air.

Each conditioner, once it has been started up, from then on operates automatically from a thermostatic control in the return air flow. This is usually set for a 10 to 12° differential from the outside air. This provides the equivalent of zone control, since each conditioner operates only as conditions in its own zone warrant it.

The packaged conditioner should not be expected to handle any area of more than 70 ft. from its base. In other words, the maximum "throw" of the discharged air will be 70 ft.

Location of the units will be considerably dependent on the size and shape of the theater to be conditioned. In the National, all units are located along the side of the theater, but those near the back of the theater have their discharge directed towards the center of the theater, rather than straight across.

Seven units are used in the 1,500-seat Tuxedo house. Two are placed on one side, and one on the other side, near the stage of the curving sidewall of the theater. These particular units are recessed, so that only the grille shows.

Two units are placed at the back wall of the theater on the main floor, with the discharge conditioned air directed straight down over the seats toward the stage.

Two more are placed at the top of the balcony, on either side of the projection room, with louvers adjusted downwards so that air goes over the heads of those sitting in the balcony.

In a long, narrow (90 ft. long by 50 ft. wide) theater that Radner is now estimating for, he contemplates the installation of a 4-unit job, with a unit in each corner, and air throw in a diagonal direction from each unit.

When an installation is made, all theater personnel are briefed on the operation of the conditioners. Usual procedure is to make someone responsible for throwing the "on" switch an hour before the first picture is to go on. This takes care of the heat load that builds up during the time the theater is not in use. (In the Tuxedo this is done from a master control panel in the manager's office, which has signal lights to show whether the unit is on or off.)

Service is, of course, an important factor. It must be prompt, and unobtrusive. Theater Air Conditioning Corp. keeps a serviceman available through 12 p.m. during the season.

With each contract, Theater Air Conditioning Corp. offers a two-year

free service contract, with the extra proviso of 3 filter changes per season.

An extra three-year's contract is offered at the flat rate of \$4 per ton per year to cover labor, with materials at cost plus 10%.

Radner believes that packaged units for theater air conditioning must have certain special attributes. They must be especially quiet. They must have the necessary devices to meet all safety code requirements.

The units should have pressure and discharge gauges permanently attached to the system. Reason for this is that if a serviceman has to check the unit while a performance is going on, he should not have to "crack" a line to put his gauges on.

How did the installations work out in the first year of their installation? The owners are all highly satisfied, and one lone complaint from a customer was recorded.

Radner looks at his theater market with confidence. For one thing, financing is readily available, as banks consider theater improvements a good risk. He is making a tie-up with the Ernie Forbes Theatrical Supply Co. to promote the use of

How Units Are Started from Manager's Office



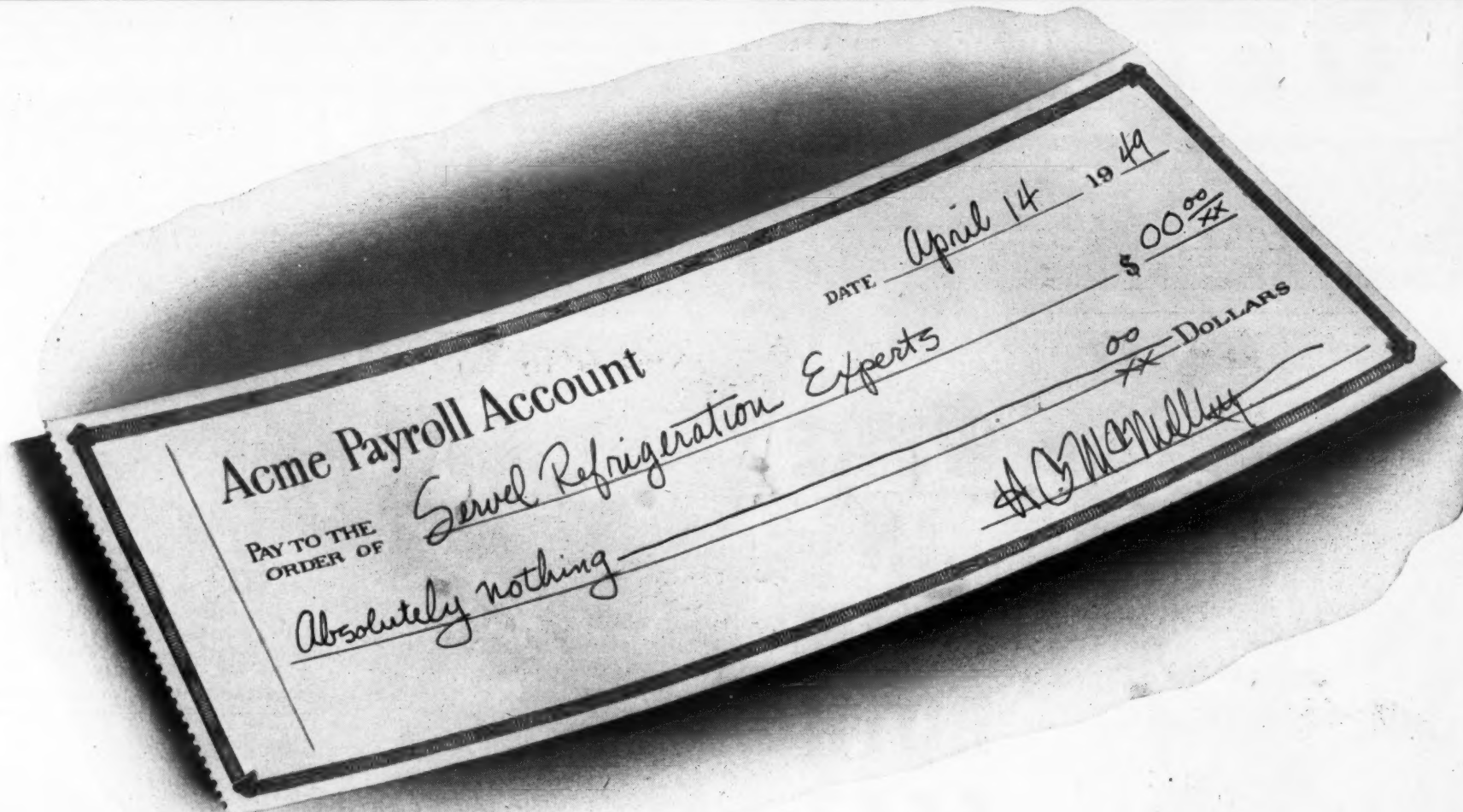
Master "on-and-off" control panel is located in the manager's office at the Tuxedo. Units are turned on about an hour before the first show; they operate automatically by thermostatic control thereafter. Radner demonstrates simple on-off switch. Light below switch shows whether unit is operating.

his line of conditioners in outstate Michigan.

"Sure, the other contractors have got onto it and are shooting for the market now," he grins. "But I think my experience has given me a head start, the confidence that I've created through the jobs already done will give me a big edge. I'm a specialist in theater air conditioning, and I'm

going to capitalize on it in my selling and advertising."

Radner is using letterheads which list the theaters in which he has installed equipment, and the owners of the theaters. As additional jobs are installed, he plans to take large advertisements in exhibitors trade magazines telling about the installation and congratulating the owners.



We'll put refrigeration experts

at your service . . . but not on your payroll!



EVAPORATIVE CONDENSERS
DRY-EX WATER CHILLERS
FREON AND AMMONIA CONDENSERS
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COPPER DEHYDRATORS

with Brass Forged Ends

The low cost of Shank Dehydrators makes it more economical to replace used dehydrators than to refill.

2" O.D.—Copper Tubing with ½" and ¾" Flare Fittings. Ends—Brass Forgings with large hexagon area for Easy Service Mounting. Copper Tube sweat fitted to forging. Brass screens and felt filter.

1" O.D.—Span End Copper Tube—Brass End Fittings properly proportioned and silver soldered. Brass screens and felt filter.

If Your Jobber Doesn't Stock—Write Us.

CYRUS SHANK COMPANY
631 W. JACKSON BLVD. CHICAGO 6, ILL.

Serval hermetically sealed Supermetic units are available in all sizes from ¼ HP through 3 HP. Also available is a full line of belt-driven units built around Serval "Superpac" compressors for direct current, odd frequency, and mobile refrigeration applications.

Serval Supermetic Features That Build Sales Profits

- Compact—Simple to Install
- "Pull-Out" Rail Edge Base
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- No Oil "Slugging"
- Forced-Feed Lubrication
- Low and Medium Temperature Models—¼ HP thru 3 HP

You get more than a condensing unit when you buy a Serval Supermetic



How would you like to have the benefit of the experience and ability of a whole staff of refrigeration experts . . . without paying them a red cent?

How? Simply by calling on Serval. We'll be glad to put all of our vast facilities and resources at your disposal to help you with any refrigeration problem. We'll help you solve unusual application problems . . . we'll give you tips on assembly . . . we'll give you the benefit of our years of experience with production lines . . . we'll supply merchandising, sales, and service aid.

We'll send our men to you, or you may come to us. We'll treat your problem as though it were our own . . . and in complete confidence. We'll work hand-in-hand with you to help you build a better product, or a better business.

You'll see what we mean when we say, "You get more than a condensing unit when you buy a Serval Supermetic." If we can be of service to you, write, wire, or phone Serval, Inc., Electric Refrigeration Division, 1904 Kentucky Avenue, Evansville 20, Indiana.

Serval

SUPERMETIC

for every commercial refrigeration requirement

Serval also manufactures the Serval Gas Refrigerator, Serval Ball-Type Gas Water Heater and the Serval All-Year Air Conditioner.

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"Detroit" Heating and Refrigeration Controls • Engine Safety Controls • Fleet Valves and Oil Burner Accessories
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EXPORT DEPARTMENT—Box 218, Ridgefield, New Jersey

Mfr. Sets Up Test Dept. for Lenco Room Conditioners

CHICAGO—A new testing department in which all units are given a complete check-up under actual working conditions has recently been completed by Lenco Engineering Co. here, manufacturer of Lenco window room air conditioners.

Units are tested in chambers so equipped that actual climatic conditions of the locality into which the units are to be shipped are simulated, the company said.

Addition of a new conveyor assembly line has doubled capacity over last year, the firm added.

The Lenco line consists of both standard and deluxe models in ½ and ¾-ton units.

A new evaporator cooler for use in low humidity climates is currently being introduced. This unit has an air circulation of 2,000 c.f.m.

Consumer Credit Drops \$1 Billion In Jan., Feb.

WASHINGTON, D. C.—A \$1 billion drop in consumer credit for January and February was the greatest decline in consumer credit for any two-month period since the war, the Federal Reserve Board reported recently.

Although about two thirds of the drop was in charge account indebtedness, instalment credit fell \$72,000,000 in February alone. Instalment credit was still \$1,649 million higher than at the end of February last year, however, the board said.

Professional Men Are No. 1 Prospects For Home Air Conditioners, Dealer Finds

Direct Mail Followed Up by Salesman Clinches Sales

WASHINGTON, D. C.—Selecting specific groups of professional men, bombarding them with direct mail, and following up with a well-trained crew of specialty salesmen has proven excellent for package air conditioner merchandising at the Blick Co. here.

The Blick Co., Washington's fourth largest ice-manufacturing organization, created its package air conditioning department in 1940, and has enjoyed steady success in package conditioner sales volume ever since—except, of course, during the shortage period of the war.

The company's experience since the end of the war has included a 50-50 balance between package air conditioners sold for home and commercial use.

The two are closely tied up, according to Samuel S. Blick, head of the firm, inasmuch as it is often the professional man, pleased with the performance of a package air conditioner in his office, who will order a similar unit for his home.

The company specializes exclusively in Frigidaire room coolers. It sells entirely through a crew of two specialty salesmen in the winter months, which is increased to 5 during the summer season. With Washington's high humidity and extreme summer temperature, room cooler sales have grown steadily, year after year, according to Blick.

Salesmen work entirely from leads created by concentrated direct mail "broadside" programs. Under this plan, all professional men likely to be using offices in downtown buildings, clinics, etc., are listed into groups, which may number anywhere from 500 to 5,000.

One group includes lawyers, another doctors, a third dentists, a fourth psychiatrists, a fifth income tax consultants, etc.—all alphabetized for easy follow-up.

At periodic intervals, each list of professional men is "bombarded" with Frigidaire-prepared direct mail, in addition to personal letters developed by the Blick Co. itself.

These are mailed with a price-discount offer during the winter months.

They play up the need for comfort to keep the professional man's clientele coming during the summer months.

Every response from mailings, which may range from as few as 100 up to 1,000 replies, is quickly followed up by the sales crew.

Paid both salary and commission, each man has gone through manufacturers' schools and specialized training on package air conditioning, and is able to estimate correctly the tonnage required for cooling any specific office.

Through excellent presentation, and the fact that almost every Washington office building now has several air conditioned offices, it has been unnecessary for the Blick Co. to resort to "rentals" or "loanouts" to keep sales up, according to the management.

Heavily emphasized by each package air conditioner salesman is the Blick service department, which varies between two and eight men, all thoroughly trained in package air conditioner repair service.

"We found it extremely important to be able to promise every customer that his conditioner will be kept in service with only a few hours delay, even in the event of a complete breakdown," Blick pointed out.

"This counts heavily, inasmuch as some of the earliest installations made in the city were out of service for weeks, until repairs could be made.

"Therefore, we give each customer a thorough understanding of the service department."

Solnick Equipment Moves To Larger Bell St. Quarters

MONTGOMERY, Ala. — Solnick Equipment Co., Carrier air conditioning equipment dealer, has occupied new and larger quarters at 134 Bell St.

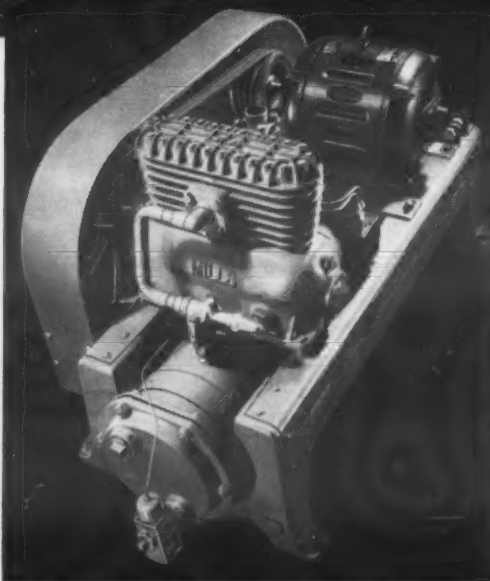
The building has been completely remodeled and refurbished, according to Robert Solnick, who is owner of the firm.



**WE'RE
IN
WITH
BOTH
FEET**

● The demand for our Compressors and Condensing Units has been maintained so consistently that we have moved the complete division from the branch plant to larger quarters at the main plant.

New Facilities at Headquarters
At the Fullerton Ave. main plant, improved facilities,



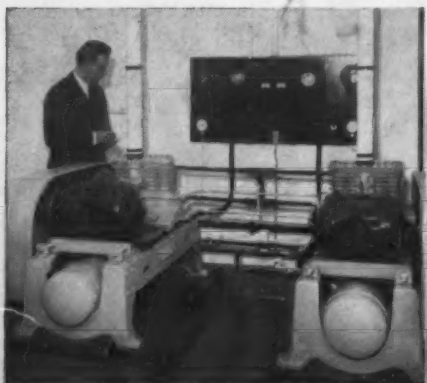
Mills Compressor and Condensing Units include a complete line of air-cooled, water-cooled, and combination air and water-cooled models.

streamlined manufacturing operations and controls have allowed us to step up production and improve deliveries and service.

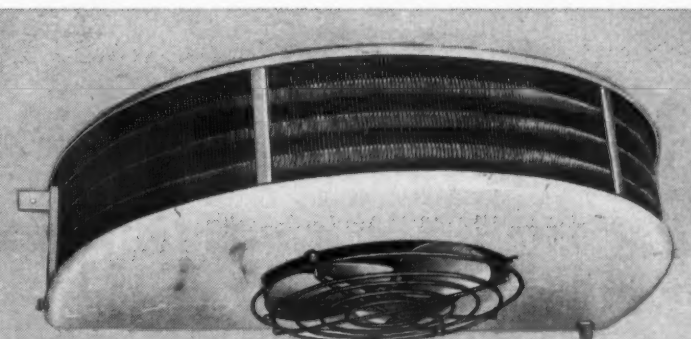
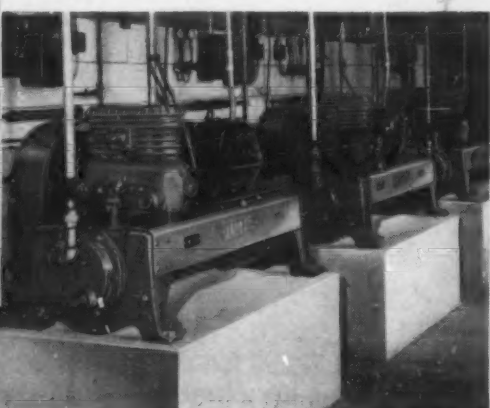
Your inquiries will receive immediate attention. Our new 64-page Bulletin 204-1 will help you in selecting appropriate units. Write today.

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MILLS
COMPRESSORS
and
CONDENSING
UNITS



Two typical installations of Mills Compressors. There is an efficient dependable Mills Condensing Unit for every installation.



Filterpure

HALF ROUND CEILING UNITS

- ★ Takes no storage space from a cooler.
- ★ Mounts against ceiling next to wall.

Combines space saving with full rated capacity and peak efficiency. Exclusive 180° arc design completely blankets interior of the fixture with gentle moving, high humidity cooling. Other features include—Exclusive Betz Coil—Built in Louvers—Built in Liquid Distributor—Life Lubricated Motors—Double Drip Pan—Slide Hangers—Baked Enamel Finish on Rust Proofed Steel.

Stocked and sold by leading Refrigeration Wholesalers

BETZ CORPORATION
HAMMOND INDIANA

Meat Ordinance Does Not Apply to Frozen Items, Court Rules

MINNEAPOLIS—A 1922 city ordinance pertaining to the sale of fresh meats, fish, and poultry is not applicable to frozen foods, according to a decision of Judge Harold N. Rogers in court here.

The finding was made in an order dismissing a charge of selling meat without a license, brought by the city against a grocer, Warren Paschke.

The city contended Paschke violated the ordinance through unlicensed sale of frozen meats, fish, and poultry kept in a low-temperature unit. Paschke said he was told informally he could get no license because his store did not meet ordinance requirements.

The judge held that the ordinance was not intended to cover frozen foods because it was enacted at a time when few, if any, such foods were on the market. If the Minneapolis city council wishes to control sale of frozen foods, the judge ruled, it must pass a new ordinance.

Fedders-Quigan First Quarter Sales Rise 10% over '48 Period

NEW YORK CITY—First quarter sales of Fedders-Quigan Corp. were an estimated 10% above those for the like 1948 period and earnings, too, were higher, stockholders were told at the annual meeting by Frank J. Quigan, chairman.

Quigan estimated that sales in the first quarter amounted to more than \$5,800,000, compared with about \$5,300,000 in the same period a year ago. He said that the March sales volume set a new monthly high, that April sales are expected to exceed the March total, and that both sales and earnings for the whole year will be higher than in 1948.

"Considerably more business" is anticipated this year as the result of the introduction of several new products, he stated. These include a line of convector-radiators and a line of vertical unit heaters.

The new convector-radiators will be produced in the recently-acquired plant at Trenton, N. J., which is scheduled to begin operation in six to eight weeks, Quigan reported.

He announced that several merger plans are being considered by the company but that no decision has been made as yet. In January, the merger with Frank J. Quigan, Inc., was approved and the number of outstanding common shares increased by 40,880 to 1,240,880.

Sapp's Handles Frigidaire Line

DENTON, Tex.—Sapp's Refrigeration Service has been appointed authorized dealer for Frigidaire commercial refrigeration and air conditioning units. This firm is located at 2614 N. Elm St.

IN AIR CONDITIONERS



Ameri-therm

LEADS IN VALUE

THINK TWICE . . .
. . . ABOUT PRICE!

In packaged air conditioners, price is only half the story; value is what counts! Actual comparison by independent researchers proves that only AMERI-THERM has all the "PLUS" features that mean greater value to your customers . . . and greater net profits to you!

Send for our free Comparison Chart

Exclusive dealer-ships still available.

AMERICAN THERMAL INDUSTRIES, INC.
442 ILLINOIS • DETROIT 1, MICH.

Young & Co. Represents Marcus

HILLSIDE, N. J.—Alvin Marcus, president of the Marcus Transformer Co., Inc., has announced the appointment of Robert A. Young & Co., as territorial representative for southern California and Arizona.

Bone Darkening Lessens When Chicken Is Stored Below -10° F.

EXPERIMENT, Ga.—Bone darkening in frozen chicken was found to be much worse when the product was stored well above 0° F. than when stored at -10° or lower, the Georgia Experiment Station noted recently.

Since only young chickens are affected, it was suggested that broilers should be stored at the lowest temperature available. Seepage of blood pigments through the soft, young bones may be reduced by the quick hard freeze and lower holding temperature, the report pointed out.

Florida Group Affiliates With National Contractors

CHICAGO—Affiliation of the Air Conditioning and Refrigeration Association of Florida with the National Association of Refrigeration Contractors was announced recently by the latter group.

Officers of the Florida association, with headquarters at Miami, are Paul E. White, president; R. Ernest Nitzsche, vice president; Harry C. Higgins, treasurer; and Howard S. Davis, executive secretary.

The association's offices are located at 1168 N. W. 41st St., Miami 37.

Cold Products Appoints Bryan

PHILADELPHIA — Haydon G. Bryan, former local distributor of refrigeration equipment, has been appointed sales manager of Cold Products, Inc., here, manufacturer of Springhouse commercial freezers, according to an announcement by A. F. Slocum, president.

Black, Sivalls & Bryson Opens New Texas Office, Transfers Some Personnel

KANSAS CITY, Mo.—Opening of a sales office in San Angelo, Tex., and personnel changes in other offices have been announced by Black, Sivalls & Bryson, Inc., here.

The company has transferred Charles W. Stevens from Odessa, Tex., to San Angelo where he will act as sales representative.

Joe Beggs, who has managed the firm's branch at McPherson, Kansas, for the past 12 years, has been appointed manager of the Ellinwood, Kan., branch. Winston O. Shook, from the Hays, Kan., branch, is now branch manager at McPherson.

M. F. (Mike) Barnes, formerly of Ellinwood, has been transferred to the sales division and will be stationed at Great Bend.

Olin L. Medley, a graduate of the University of Oklahoma, has joined the Shreveport, La. branch.

Georgia U. Issues Data on Dairy Storage Temperature

ATHENS, Ga.—J. J. Sheuring, of the dairy department of the University of Georgia, recently recommended the following storage temperatures for dairy products:

Sweetened cream, -15°; sweet cream butter, -10°; sweetened condensed whole milk, 35°; dry skim milk and whole milk powders, 40°; ice cream, -15°; cheese and cheese foods, 35°. Sheuring said concentrated skim milk might be kept for a short time at -15°.

He stressed the importance of good containers.

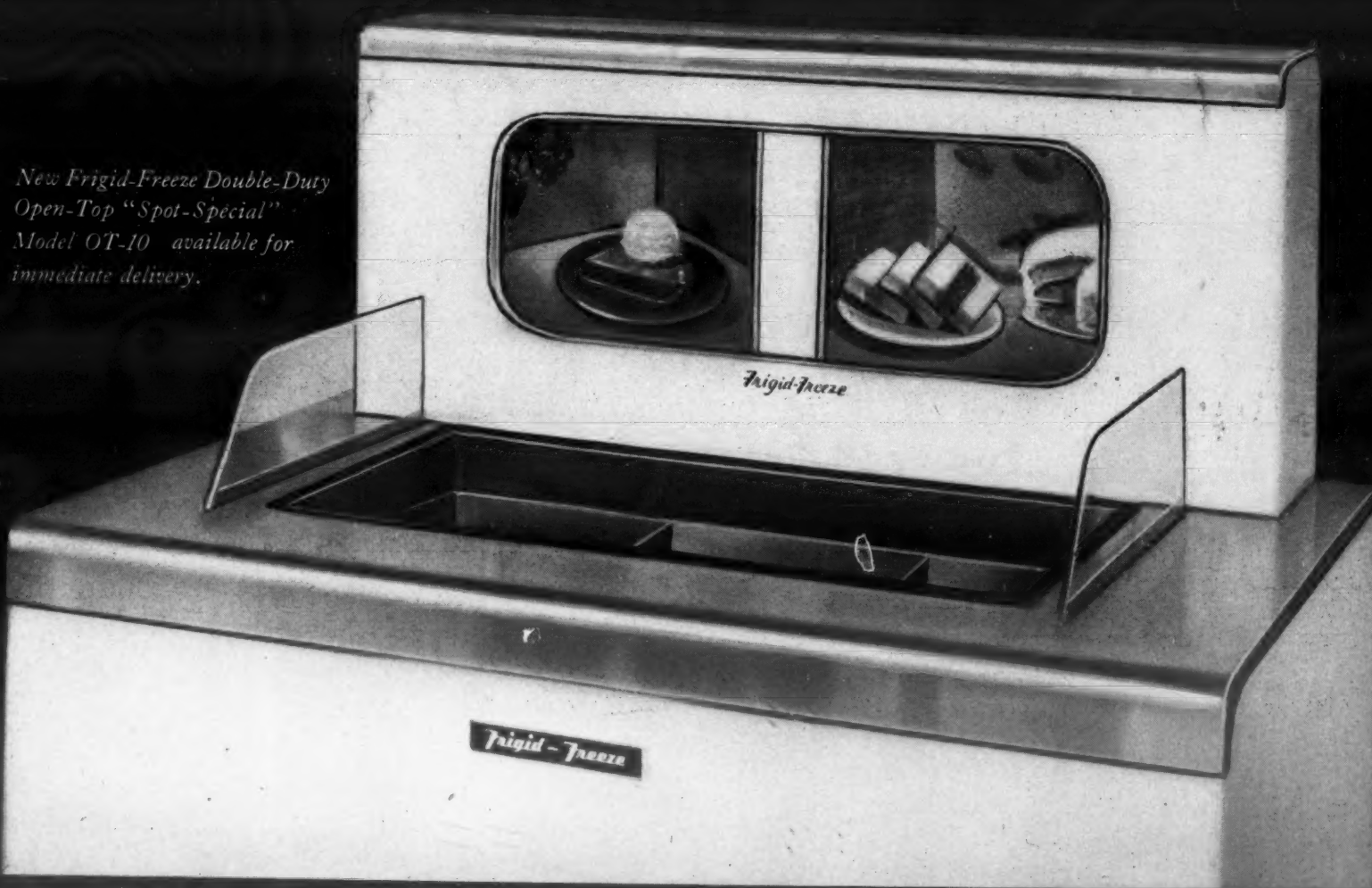
Refrigeration Added in 4 Depts.

BUFFALO — Incorporated in the newly-opened A&S supermarket at the Airport Plaza here, are a refrigerated self-service meat department, a refrigerated fresh fruit and vegetable department, a self-service refrigerated dairy department, and a quick-frozen foods department.

BRAND NEW DESIGN...

2/3 more capacity...

minimum floor space



New Frigid-Freeze Double-Door Open-Top "Spot-Special" Model OT-10 available for immediate delivery.

COMPLETELY RE-DESIGNED—this self-service cabinet features advanced styling, modern streamlining that makes it the most beautiful cabinet ever built.

LARGER CAPACITY—IN MINIMUM FLOOR SPACE—now enlarged to hold $\frac{2}{3}$ greater capacity than the amazingly successful "Spot-Special" cabinet pioneered by Frigid-Freeze.



Frigid-Freeze

REFRIGERATION CORPORATION OF AMERICA
BARBER, NEW JERSEY · A DIVISION OF NOMA ELECTRIC CORPORATION

DRESS UP THE SMALL STORE WITH COLD-IN



JR. 4 FRONT VIEW

COUNTER HEIGHT 41"

CLEAR VISION DISPLAY AREA

ALL PORCELAIN
EXTERIOR AND INTERIOR

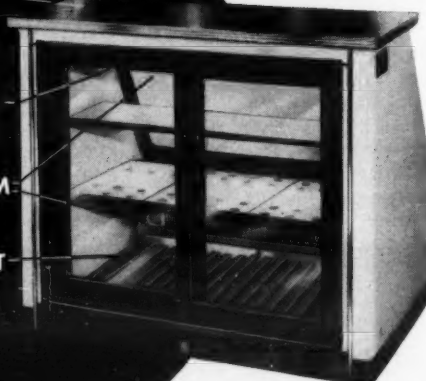
FORMICA TOP

FLUORESCENT LIGHTING

COILS TOP AND BOTTOM

STORAGE COMPARTMENT

The COLDIN Jr. 4—multiple duty display-storage-service case is designed to eliminate the old type counter.



JR. 4 BACK VIEW

The Coldin Jr. is a refrigerator for every small grocer, every small baker and every small delicatessen's budget!

Coldin Jr. 4 is so easy to sell, so profitable to sell. Feature the Coldin Jr. 4 in your showroom NOW!

Write for illustrated literature on complete profit selling line.

Coldin Cabinet Co., Inc.

2800 Webster Avenue, Bronx 58, N. Y.

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Concentrate on the *Cream* of the Market

THE QUICK PROFIT RANGE
in Air Conditioning
1 1/2 Ton to 10 Ton
PACKAGED UNITS

TYPHOON self-contained, free-standing units require no duct work — installation is quick, easy — you can do more jobs per year — your dollars turn over faster.



Plus

a line of: EVAPORATIVE CONDENSERS — 3-5-7 and 10-ton sizes. COMPRESSORS — 1/2-ton to 50-ton units. LOW SIDE UNITS — 3-5-7-10-ton.



TYPHOON AIR CONDITIONING CO., INC.

794 Union Street

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Tie up with
TYPHOON

Backed by a sales-winning program of dealer promotion and sales-training. Nationally advertised.

TYPHOON'S
40th Anniversary
1909-1949

60% Jump In Sales Chalked Up In Detroit 2 Years In Row

DETROIT—Sales and installations of air conditioning in Detroit continued their sharp increase in 1948, gaining nearly 60% over the figures for the previous year of 1947.

Coincidentally, the gain in 1948 of 59.1% over 1947 was almost an exact repeat of the increase in 1947, when sales jumped 60.8% over 1946.

Compiled from permits issued for air conditioning installations by the Detroit Department of Buildings and Safety Engineering, the tabulations made by AIR CONDITIONING & REFRIGERATION NEWS reveal that 673 self-contained air conditioners and condensing units (for central systems) were installed during 1948 in 516 different establishments.

This represents a connected horsepower total of 5,923 3/4 hp., not including drives for fans in central-type installations.

In the preceding year (1947) there were 423 units and compressors installed in 286 establishments, while in 1946 a total of 266 units went into 213 establishments.

Percentage-wise, the gain in connected horsepower over the three-year period has not kept pace with

the unit increase. Installed horsepower in 1946 totaled 5,229 3/4; in 1947, 5,571 1/4; in 1948, 5,923 3/4.

The accompanying tables and graphs show the important data for both 1947 and 1948. Listed are the unit and compressor sales by size and type of equipment, where the sales were made, how installations varied by months, and how the 46 contractors who handled jobs in Detroit during 1948 shared in the total sales.

Most popular size during 1948 continued to be the 5-hp. unit, 362 being sold, more than half of the total 673. The same was true in the two previous years, however.

Ranking next in popularity for all three years was the 3-hp. model, 115 of these being sold in 1948. Third in rank during 1948 was the 7 1/2-hp. machine, with 56 installations being recorded. This represents a definite increase over the preceding two years, as the tables indicate.

Largest compressor installed for air conditioning during 1948 was the 75-hp. size, six of which went into operation in Detroit. In 1947 one 100-hp. and two 300-hp. were in-

(Continued on next page)

Size and Amount of Air Conditioning Equipment Installed In Detroit During 1947 and 1948

| Size In Hp. | 1947 | | | 1948 | | |
|-----------------|------------|-----------------|------------|------------|-----------------|------------|
| | *Central | *Self-Contained | Total | *Central | *Self-Contained | Total |
| Less than 3 hp. | 3 | 8 | 11 | 7 | 2 | 9 |
| 3 | 1 | 72 | 73 | 8 | 107 | 115 |
| 5 | 8 | 204 | 212 | 25 | 337 | 362 |
| 7 1/2 | 11 | 7 | 18 | 19 | 37 | 56 |
| 10 | 7 | 4 | 11 | 18 | 10 | 28 |
| 15 | 23 | 6 | 29 | 31 | 2 | 33 |
| 20 | 13 | ... | 13 | 8 | ... | 8 |
| 25 | 13 | ... | 13 | 26 | ... | 26 |
| 30 | 4 | ... | 4 | 9 | ... | 9 |
| 40 | 7 | ... | 7 | 9 | ... | 9 |
| 50 | 7 | ... | 7 | 5 | ... | 5 |
| 60 | 6 | ... | 6 | 7 | ... | 7 |
| 75 | 16 | ... | 16 | 6 | ... | 6 |
| 100 | 1 | ... | 1 | ... | ... | ... |
| 300 | 2 | ... | 2 | ... | ... | ... |
| Total | 122 | 801 | 423 | 178 | 495 | 673 |

**"Central" systems, as tabulated here, are those where the air conditioning equipment is not located within the conditioned space, in contrast to the "self-contained" equipment which is installed within the conditioned space. Included in the "central" column, however, are a number of self-contained machines which have been remotely installed.



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Sales of Air Conditioning During 1948 Continued Their Postwar Boom In Detroit

(Continued from preceding page)
stalled, while in 1946 there were five machines installed that were larger than 75 hp.

The comparison between "self-contained" and "central" type installations as shown in the tables will prove interesting, but it should be pointed out that classifying these installations does present a problem.

As employed here "central" systems refer to those where the conditioner is not located within the conditioned space, while "self-contained" means the unit is placed in the conditioned area.

Actually, packaged units were probably employed in several "central" type installations. The data given here, however, is thought to be reasonably accurate.

Thus, the figures for 1948 show there were 495 self-contained units installed, as compared with 178 central-type installations. Naturally, all the larger installations were of the remote type.

The comparison for 1948 is likewise reflected in the two previous years. During 1947 there were 301 self-contained jobs and 122 central; in 1946, 202 self-contained and 64 central.

Shown graphically is a comparison of sales and installations for central and self-contained systems during 1948 by month. As might be expected, the peak was reached in the

middle of the summer—July—when 125 installations were made. This carried over into August, also, when 91 systems went in.

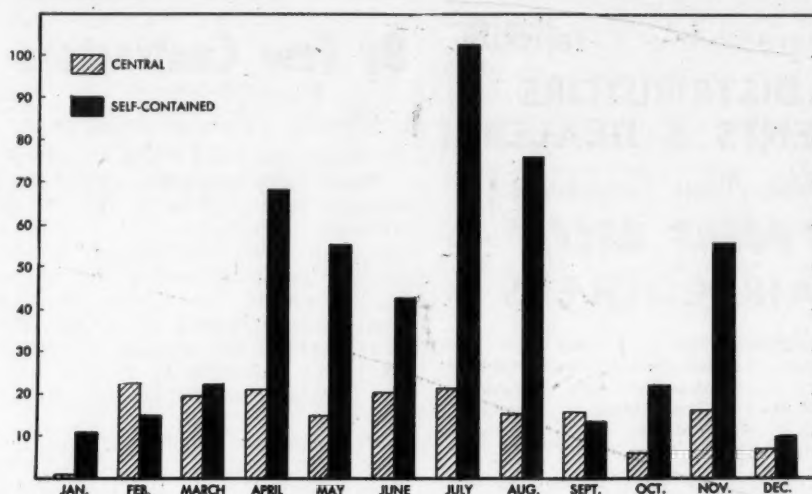
Earlier in the year there had been a sharp spurt in April when sales zoomed to 90. Following the letdown during September and October after the hot summer months, there was another upsurge in November. January and December were the lowest months.

Number of installations for all 12 months were as follows: January, 12; February, 37; March, 42; April, 90; May, 68; June, 63; July, 125; August, 91; September, 33; October, 27; November, 69; and December, 16.

Looking at the record for 1947 and 1948 from the viewpoint of type of establishment which purchased air conditioning, one notes that a wide variety is included, showing the di-

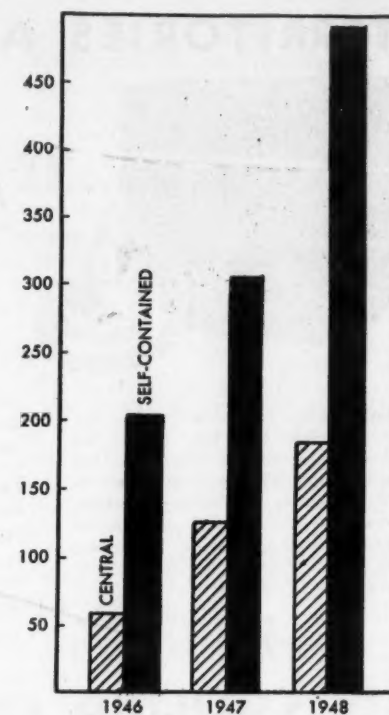
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3 Seasonal Peaks Shown In 1948 Detroit Sales



ABOVE: As might be expected, the peak period for sales of air conditioning during 1948 in Detroit occurred during the hot summer months of July and August. Note, however, that April and November were relatively high also.

RIGHT: The steady increase in air conditioning sales in Detroit since the war is graphically indicated by the sales for 1946, 1947, and 1948.



Number of Contractors Who Installed Air Conditioning Units In Detroit In 1948

| Contractor | No. | % |
|------------|-----|------|
| A | 126 | 18.7 |
| B | 69 | 10.2 |
| C | 44 | 6.5 |
| D | 43 | 6.4 |
| E | 40 | 5.9 |
| F | 39 | 5.8 |
| G | 34 | 5.0 |
| H | 32 | 4.8 |
| I | 31 | 4.6 |
| J | 25 | 3.7 |
| L | 17 | 2.5 |
| M | 15 | 2.2 |
| N | 14 | 2.1 |
| O | 14 | 2.1 |
| P | 14 | 2.1 |
| Q | 12 | 1.8 |
| R | 11 | 1.6 |
| S | 9 | 1.3 |
| T | 9 | 1.3 |
| U | 9 | 1.3 |
| V | 8 | 1.2 |
| W | 7 | 1.0 |
| X | 7 | 1.0 |
| Y | 5 | .7 |
| Z | 4 | .6 |
| AA | 3 | .4 |
| BB | 3 | .4 |
| CC | 3 | .4 |
| DD | 3 | .4 |
| EE | 2 | .3 |
| FF | 2 | .3 |
| GG | 2 | .3 |
| HH | 2 | .3 |
| II | 2 | .3 |
| JJ | 2 | .3 |
| KK | 1 | .2 |
| LL | 1 | .2 |
| MM | 1 | .2 |
| NN | 1 | .2 |
| OO | 1 | .2 |
| PP | 1 | .2 |
| QQ | 1 | .2 |
| RR | 1 | .2 |
| SS | 1 | .2 |
| TT | 1 | .2 |
| UU | 1 | .2 |

Total 46 673 100.0%

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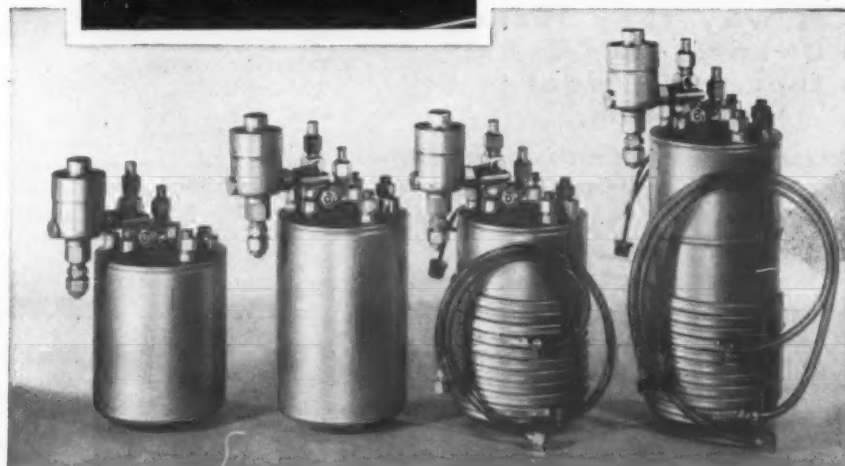
Shown above, Model B4-10 for 1/2 in. O.D. tube, \$11.25 F.O.B. Evansville, Ind. See complete line Handy Tube Benders at your local supply house, or write

HOLSLAW BROS., INC.
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765 GLASSES of 40° Beer per hour without use of Precooler



REFRIGERATION SERVICE ENGINEERS like the compact size and simplified construction of Temprite draught beer coolers. A Temprite unit can be sold with complete confidence and installed with the least amount of effort.



4 HEAVY-DUTY Temprite draught beer coolers shown above are designed for installation where precooler is not provided or where beer kegs are stored in a warm room or basement. They'll handle up to 3 brands of beer plus plain and carbonated water...from the same cooler at the same time. 4 medium capacity models (not illustrated) are available for lighter requirements or where a precooler is provided.

NEW HEAVY DUTY TEMPRITE BEER COOLERS draw perfectly cooled beer...instantaneously ...from 70° inlet temperature

The new heavy duty Temprite draught beer coolers are designed to do the entire cooling job strictly on their own. No precooler is necessary. Temprite's famous patented instantaneous cooling principle makes this possible. Beer coils are submerged in the liquid refrigerant itself and the heat of the beer is transferred directly into the main body of the refrigerant.

Any of the four heavy duty models will draw up to 765 glasses (48 gallons) of 40 degree beer hourly, from a 70 degree inlet temperature. Instantaneous cooling gives each unit a very high overload capacity which means that no matter how frequently the tap is opened during rush periods, the beer is right for drinking pleasure.

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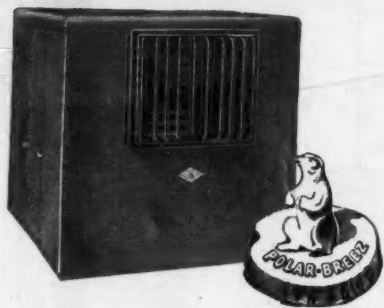
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Air is purified by a chemical process removing bacteria and algae. Range

—2,000—25,000 C.F.M. . . . Glass Fibre Filter Cooling Pads . . . Self cleaning—no servicing or replacement . . . Weather Proof Metal Housing . . . Multi-Blade Pressure Type Blower . . . Directional Flow Grille . . . Roto-Atomizer . . . Doubles cooling and washing action!

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REFRIGERATION & AIR CONDITIONING DIRECTORY
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**Most Jobs Handled
 By Few Contractors**

(Concluded from preceding page)

versity of market for this equipment.

Restaurants were the leading purchasers during 1948, a total of 97 different establishments purchasing 751½ hp. of air conditioning. In both number and total horsepower, offices ranked second, there being 76 such installations totaling 687½ hp. Taverns represented another important source of prospects, 42 of them having purchased air conditioning during the year.

Tonnage-wise, theaters are still important, it is indicated, 593 hp. having been installed in 11 theaters during 1948.

Stores of all types are represented in the listings, which also feature a number of industrial applications, a church, several banks, hospitals, and the like.

As for the 46 contractors who handled all these air conditioning jobs in Detroit last year, a glance at the accompanying table will show that the majority of installations were made by a small group. The figures show that the top seven contractors, representing 15% of the total, handled 54% of all the jobs.

Contractor A, for example, who put in 126 units, garnered 18.7% of the total jobs in the city during 1948—almost twice as many as his nearest competitor, who sold 69 units.

At the other extreme there were 11 contractors who installed one unit apiece; six who installed two units each, and four who each handled three.

**Where Air Conditioning Was Installed
 In Detroit During 1947 and 1948**

| Establishment | 1947 | | 1948 | |
|----------------------------------|------|--------|------|--------|
| | No. | Hp. | No. | Hp. |
| Airline office | 1 | 5 | 1 | 5 |
| Airport control tower | 1 | 5 | 1 | 5 |
| Art supplies store | 1 | 5 | 1 | 5 |
| Appliance store | 1 | 5 | 5 | 55 |
| Auditorium | 1 | 5 | | |
| Bakery | 1 | 5 | 3 | 30 |
| Bank | 9 | 520½ | 18 | 283 |
| Barber shop | 1 | 5 | 1 | 2 |
| Beauty parlor | 1 | 5 | 1 | 3 |
| Bookstore | 1 | 5 | | |
| Bowling alley | 4 | 115 | 8 | 165 |
| Brewery | 1 | 5 | 2 | 52½ |
| Bus garage | | | 1 | 118 |
| Cafeteria | 2 | 15 | 2 | 20 |
| Candy manufacturing | 1 | 2 | 2 | 25 |
| Candy store | | | 3 | 11 |
| Carpeting store | | | 1 | 5 |
| Church | 1 | 5 | 1 | 7½ |
| Clinic | 1 | 5 | 3 | 20 |
| Clothing store | 8 | 102½ | 11 | 206 |
| Conference room | 4 | 25½ | 2 | 10 |
| Club | 2 | 17½ | 2 | 10 |
| Dairy bar | | | 2 | 10 |
| Delicatessen | | | 1 | 8 |
| Dentist | 1 | 7½ | 2 | 13 |
| Department store | 6 | 375 | 8 | 425 |
| Die manufacturing | | | 1 | 240 |
| Doctor's office | 6 | 28 | 11 | 48½ |
| Drafting room | 1 | 10 | 4 | 53 |
| Dress shop | 10 | 123 | 17 | 163½ |
| Drug manufacturing | 2 | 608 | | |
| Drugstore | 7 | 62½ | 20 | 176½ |
| Dry cleaning | 1 | 5 | | |
| Egg wholesaler | 1 | 5 | 1 | 10 |
| Factory | 11 | 994 | 3 | 178 |
| Florist | 1 | 5 | | |
| Food processing | 2 | 25 | 1 | 5 |
| Foundry | | | 1 | 10 |
| Funeral home | 3 | 17½ | 10 | 68½ |
| Fur store | 1 | 10 | 6 | 45 |
| Furniture store | 1 | 15 | 4 | 25 |
| Gift shop | | | 2 | 10 |
| Haberdashery | 7 | 29 | 8 | 34½ |
| Hosiery shop | 1 | 8 | | |
| Hospital | 3 | 45 | 6 | 38 |
| Hotel | 2 | 95 | 2 | 21 |
| Insurance office | | | 2 | 40 |
| Jewelry store | 10 | 51½ | 12 | 86 |
| Laboratory | 2 | 50 | 6 | 37½ |
| Library | 1 | 25 | | |
| Loan company | | | 1 | 5 |
| Malt manufacturing | | | 1 | 140 |
| Manholes (portable installation) | | | 2 | 6 |
| Market | 1 | 10 | 9 | 74 |
| Medical college | 1 | 1½ | | |
| Music store | 4 | 23 | 2 | 13 |
| Office | 62 | 920½ | 76 | 687½ |
| Optical store | | | 1 | 3 |
| Photoengraver | | | 1 | 15 |
| Photo studio | 2 | 11 | | |
| Plating shop | | | 1 | 3 |
| Printer | | | 3 | 53 |
| Publishing house | 1 | 10 | 2 | 13½ |
| Radio studio | 2 | 30 | 2 | 13½ |
| Railroad depot | 1 | 60 | | |
| Real estate office | | | 3 | 17½ |
| Record shop | | | 2 | 9 |
| Refrigeration service shop | 1 | 1 | | |
| Residence | 6 | 18½ | 5 | 24½ |
| Restaurant | 24 | 248 | 97 | 751½ |
| Salesroom | 3 | 18 | | |
| Salesroom, auto | 7 | 41 | 15 | 118½ |
| Seed grower | | | 1 | ¾ |
| Shoe store | 5 | 38 | 7 | 33 |
| Storage | | | 2 | 10 |
| Store | 9 | 169 | 23 | 117½ |
| Tavern | 25 | 189 | 42 | 272 |
| Telegraph office | | | 1 | 65 |
| Television studio | | | 2 | 60 |
| Theater | 6 | 257½ | 11 | 593 |
| Tool shop | | | 2 | 11 |
| Union auditorium | 1 | 25 | | |
| Unknown | 5 | 46 | 2 | 25 |
| Upholstery shop | | | 1 | 5 |
| Warehouse | 1 | 20 | | |
| Wine shop | 1 | 3 | | |
| Total | 286 | 5,571½ | 516 | 5,923½ |

*More and More...Engineers Agree
 that It's not **HOW MUCH** moisture
 you remove from a refrigeration system
 that counts...*

**...It's HOW LITTLE moisture
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**That is why they install a
 SPORLAN CATCH-ALL
 when they really want to dry
 a system.**

**They know that the Catch-All is the
 Perfect Filter-Drier because it dries
 down to a Low End Point...a point
 So Low that any remaining
 moisture is
 absolutely harmless!**

**why is the
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Catch-All

THE PERFECT FILTER-DRIER?

because

Its unique, porous cylinder is made up of minute particles of a highly efficient desiccant, whose efficiency is greater than that of the same desiccant in granular form.

because

After being completely assembled, it is activated to a high degree of dryness and immediately sealed with moisture proof seals to prevent any moisture from entering before installation.

because

It cannot powder!

**When you want clean Bone-Dry refrigeration systems...
 install Sporlan Catch-Alls and get Peak Performance on all installations**

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because

It cannot pack!

because

The refrigerant cannot channel!

because

Being scientifically molded to provide progressive filtering it filters any foreign matter as minute as 9 microns with negligible pressure drop.

Having a molded, porous cylinder, the Catch-All is inherently free from powdering, packing, and channeling. Designed scientifically to give maximum contact of refrigerant and desiccant, the Catch-All is a perfect filter and a perfect drier.

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Larger Capacity Catch-Alls with Replaceable Cores and a New Small Size Catch-All for Domestic Refrigerators and Small Commercial Package Units.

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Utilities Push Sought

Growth of Home, Farm Freezer Amazing Despite Industry Neglect, Duggan Says

CHICAGO—Declaring that the food freezer has no peer as a desirable load builder, F. F. Duggan chairman of Nema's farm and home freezer section, told Edison Electric Institute that this appliance "deserves its rightful share of your merchandising efforts."

Duggan, who is also general sales manager of Deepfreeze Div., Motor Products Corp., spoke before the residential section of EEI during the institute's 15th annual sales conference at the Edgewater Beach hotel.

Discussing "The Utilities and the Home Freezer Industry," Duggan pointed out that "despite a considerable indifference on the part of many of the largest dealers, and a friendly neglect on the part of most of the utilities who have been absorbed in many other pressing matters," the farm and home freezer has shown "quite amazing growth."

1,400,000 Units In Use

He said estimated industry sales in 1946 totaled 210,000 units; those in 1947, 450,000 units; and those in 1948, 675,000 units. Estimated total present saturation is 1,400,000 units.

"Despite the fact that a freezer renders a totally new service in the home, and unlike a range, refrigerator, and vacuum cleaner, and other appliances, does not replace an existing device, this appliance, in seven actual years, from 1938 through 1948, leaving out the war period, has reached a saturation that took most of its bigger brothers more than 20 years to attain," Duggan declared.

"It has long been an axiom that the sale of the first million of a new device represents the true pioneer stage, and that after that point has been reached, public acceptance will aid in a normal growth. Today, by the most conservative estimates, there are more than 1,400,000 farm and home freezers in use.

"The electric range was a big volume appliance, and had definitely arrived in 1940, when the industry sold 450,000 units for the year. There were 675,000 freezers sold in 1948, at an estimated retail volume of \$202,500,000.

Public More Sold Than Industry

"There are many other interesting comparisons that could be made, but these will suffice to indicate that up until now, the public has been actually more sold on farm and home freezers than have many large segments of the appliance industry."

Duggan then cited a few of the advantages to the homemaker of this new appliance.

"With a home freezer," he said, "any housewife may buy foods in quantity when they are at the peak of their quality, at material price savings. She shops less often—goes to the store only once every 10 days to two weeks rather than the customary two or three times each week.

"With a home freezer there is no such thing as a season in foods. Every home can enjoy any food at any season of the year.

"A home freezer saves time over canning or any other food preservation method. It eliminates waste, and with a home freezer there is no such thing as left-overs, but only food cooked ahead.

"The home freezer saves time and work for any homemaker by enabling her to cook pies, cakes, breads, or any large quantity of food ahead and store them for the time that they will be needed.

"Best of all, a home freezer will actually pay for itself!"

Continuing, Duggan stressed that appliance dealers and salesmen, although trained to sell the product, need tremendous help from the manufacturers and utilities to do the first job, that of selling the need.

"Historically," he said, "the electric utility industry has played a major part in selling the need and use values of every new desirable electric appliance. The pioneer selling of electric ranges and water heaters was done over a period of years through consistent, intensive efforts of electric utilities.

"The electric utilities have aided in the basic educational job on refrigerators, roasters, washing machines, vacuum cleaners, and all small appliances, including the radio.

"We say to you, as merchandising executives, that the home freezer deserves its rightful share of your merchandising efforts."

"The enlightened public interest which has always been a fundamental principle with electric utilities, requires that you take the same major hand in the development of the market for this appliance that you have taken with every other electric device that has served the American home.

"As a desirable load building appliance, the electric home freezer has no peer. It is a 110-volt, plug-in appliance, requiring no special wiring nor capital investment to serve it.

"It has an even load curve, and cycles evenly throughout the day. It does not build up a peak load during the heavy use hours, and operating and rate departments welcome it as they did the electric refrigerator, its most desirable predecessor.

"Here are figures that are sure to be of interest to you, and may even be surprising.

"Based on an annual average consumption of 600 kwh. per freezer, the 675,000 home freezers added to your lines in 1948 will use 405,000,000 kwh. per year.

No. 2 Load Builder

"This is the second largest load added to your lines by new plug-in appliances in 1948. The only plug-in device adding greater load during the past year was the big brother of the home freezer, the electric refrigerator, and it took the sale of almost nine times as many refrigerators to add only three and one-half times as many kwh. . . .

"This industry greatly needs the full assistance of the electric utilities to do the great job ahead, and the home freezer recommends itself to the utilities as an ideal labor and money saving home appliance, and as a load building device second to none ever offered.

"There is the further consideration to utilities that the job of selling the need is largely done for most other attractive load building appliances. Public education—the job at which you utility merchandising people have no peer—will now be most rewarding and offer the greatest opportunity for plus attractive load if directed toward the farm and home freezer."

At the closing luncheon session of the conference, E. R. Acker, EEI president, said the major challenge now facing the nation's privately owned electric light and power companies is the selling at a fair profit of the tremendously expanded power capacity of the industry.

Power Capacity Up 50%

For the industry as a whole, he reported, the capacity added during the six years from the end of the war to the end of 1951 will total 25 million kilowatts, an increase of 50%. The private, business-managed electric companies alone, he stated, will have expanded their capacity from 40 million to 61 million kilowatts by the end of 1951.

Fred A. Compton, general sales manager of Detroit Edison Co., said at one of the general sessions that increased sales of television receivers has resulted in less sales of other electric appliances. Most persons, he declared, want an appliance that entertains before one that saves labor.

Speaking at the farm section luncheon, Dr. William I. Myers, dean of the New York State college of Agriculture at Cornell university, said he expected to see a continued, steady increase in the use of electric power to operate labor-saving equipment, especially on livestock farms.

Its increased use in homes may be slowed temporarily if our economic readjustment is severe, but it is reasonable to expect marked increases in the next six or eight years.

Discussing the general economic situation, the Cornell dean stated that "sooner or later it seems certain we will have a substantial decline in prices, business activity, industrial production, and employment until stability is regained at a somewhat lower level." His opinion is that this decline has already started.

In spite of the record—a violent recession after every previous war—Dean Myers reported a possibility of

a less violent decline this time because of the steps taken to cushion declining demand.

He listed as favorable factors the shortage of all kinds of buildings, public and private, and of telephone and electric power facilities. This indicates a need for continued high production of heavy industry even though it may be below recent peaks.

Also mentioned was consumer demand which continues high for products such as automobiles and household equipment at reduced prices.

"People have stopped buying, at any price, but are buying more carefully and are saving more," he said.

Other factors cited that would help to ease a recession jolt include: the European Recovery Program, rearmament for adequate defense of

the U. S.; probable assistance in rearmament of countries in the North Atlantic Pact, public construction of highways, schools and housing, conservative level of the stock market, unemployment insurance, price supports for farm products, and wide use of economic information.

Turning to the agricultural situation and outlook, Dean Myers said farmers are in a better position than ever before to withstand unfavorable conditions because of their low level of debts and their strong reserves.

"Debts are not a serious problem in agriculture," the session was told. Presentation of 1948 awards was a feature of the sessions.

The George A. Hughes awards, consisting of \$2,400 in cash prizes as well as trophies and plaques, were presented to eight electric utility companies that conducted outstanding local educational activities to advance electrical living last year.

Offered each year by Hotpoint, the awards are sponsored by EEI.

Prizes were presented to winners in four classifications of promotional activity: Class I, electric kitchen; Class II, domestic electric range; Class III electric water heater; Class

IV, commercial electric cooking.

Class I winners were Southern California Edison Co., first prize, and Union Electric Co., second prize. The Utah Power & Light Co., and the Pennsylvania Power & Light Co. were first and second prize winners, respectively, in Class II.

Class III prizes were won by Detroit Edison Co., and Pennsylvania Power & Light Co. In Class IV, West Penn Power Co. and Ohio Power Co. took prizes.

Mrs. Lucile Ramirez, home service director, Washington Water Power Co., Spokane, Wash., received the award in Division A of the Laura McCall Home Service Awards for her company's achievements in home service operations during 1948.

Miss Margaret Schneider, home service director of the Wheeling Electric Co., Wheeling, W. Va., received the award in Division B.

Miss Marguerite Fenner, home service director, Pacific Gas & Electric Co., San Francisco; Miss Elizabeth Parker, home service director, Georgia Power Co., Atlanta; and Mrs. Kathryn Spencer, home service advisor, Indianapolis Power & Light Co., Indianapolis, won in Division C.

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INLAND MANUFACTURING DIVISION
General Motors Corporation, Dayton, Ohio

Factors In Determining Optimum Conditions for Industrial Workers

Davidson Tells How New Ideas on 'Comfort Zone' Came Out of Studies of Textile Plant Cooling

By P. L. Davidson, Consulting Engineer, Philadelphia

Editor's Note: Mr. Davidson's discussion of "Industrial Air Conditioning," presented as a paper late last year before the Carolina and Philadelphia sections of the American Society of Refrigerating Engineers, is a particularly informative discussion of the determination of the proper effective temperature for industrial workers. It will prove valuable to all who are concerned with the design of systems that will condition spaces in which production workers are employed.

Man's dramatic conquest of summer's heat was ballyhooed during the thirties as the basis for an industry which would lift us from the mire of economic depression. While these wishful predictions failed for reasons logical to those who understand the real basic nature and problems of air conditioning, still comfort cooling experienced a healthy growth and development and comfort air conditioning became thoroughly accepted.

While to the public, air conditioning dates back barely two decades, we all well know that the science of air conditioning was developed and functioning in industry over 40 years ago; primarily as a result of the need for production control of the materials affected by atmospheric humidity changes.

During the thirties when depression all but stopped industrial expansion, industrial air conditioning experienced a slow but slight advancement when compared with the strides made in comfort cooling.

In the last ten years, however, aided by the tremendous industrial expansion and by public acceptance of comfort cooling, industrial air conditioning has experienced a renaissance. Expansion appears to continue unabated with broad acceptance of the solid dollar value of increased worker efficiency through comfort maintenance as well as improved product control through atmospheric condition maintenance.

Studies In Textile Field

The phase of industrial air conditioning which is most interesting to this group is textile air conditioning. We believe that general development and general considerations in application in this field are fairly typical of the broad field of industrial air conditioning. For this reason we will limit our review and discussion to this field.

Staple textile fibers were first combed by hand and the yarns spun on foot powered spinning wheels. Cloth was woven on hand powered looms. During this period of cottage style manufacture, it was found that humidity conditions in some parts of England and France were particularly suited to the production of fine cloth. One of the old traditions of the industry, which lingered on long after it ceased to be true, was that fine textiles could be produced only in these areas.

With the development of power driven machines and growth of the

factory system, the heat liberated by machinery raised the dry bulb temperature and lowered the relative humidity in mill interiors to such an extent that artificial means of humidification were required even in these favorable geographical areas.

Meeting the Problem Before Advent of Air Conditioning

The only difference between a mill located in a moist section and one in a drier section of a country was that the latter mill would require more supplemental humidification. Until 1910 the only means of humidifying mill areas was by the direct introduction of water spray into the air.

In the meantime, the textile industry had improved its machinery either by speeding it up or making it more compact so that, in effect, much more production, with a consequently higher horsepower load, could be obtained within a given floor area. By the same token this increased production resulted in a vastly increased heat liberation within a given floor area. The result was that it became impractical to maintain humidity conditions merely by the introduction of water sprayed directly into the air as temperatures in some spinning rooms would run as high as 120° F. Textile machinery progress thus necessarily led to the development of means of controlling mill temperatures by the introduction of saturated or super-saturated air in mill areas through central station systems or units. In many cases the air quantities employed were very large and complete change of air in mill areas once every two or three minutes were not uncommon.

Through the use of air change, mill temperatures could be considerably reduced, but were still dependent upon the humidity required for the process and the outside wet bulb temperature. Thus a mill in the northern part of New England or high in the Piedmont where relatively low wet bulb temperatures prevail could maintain practicably much more comfortable working conditions than a mill located in the lower levels of the South where the outside wet bulb is higher.

These limitations of evaporative cooling are well understood. Even the weaver and the spinner found that the higher the relative humidity the lower would be the temperature of the room so they continued to ask for higher and higher relative humidities in a conscious or un-

conscious effort to improve their own comfort.

Change of Thinking on R.H.

Thus, there was a tendency for the operatives to force higher relative humidities than were desirable for the process in question. For example, one cotton mill now equipped with refrigeration, spinning high counts of Pima cotton, has found that best running conditions in spinning are obtained with relative humidities in the neighborhood of 45%. Previous practice in the same mill was to operate at 60% during the summertime even though this high humidity drastically reduced production because of lapping and attendant difficulties.

It was generally recognized that the only way to relieve this condition was by the installation of refrigeration, but, on surface analysis, tonnage requirements were so large and the estimated cost of installation appeared so high that at that time, the proposition received scant attention when budget figures were presented. In fact one of the biggest manufacturers of refrigeration equipment for air conditioning stated categorically in 1930 that textile mills would never install refrigeration.

A few mills situated in areas such as the Shenandoah Valley, where well water was available at temperatures and quantities suitable for cooling, found that fully controlled

air conditions afforded excellent production results. When Japan started to develop its own textile industry most of the mills were located in areas where well water was available and there, too, it was found that maintenance of constant and comfortable temperature and humidity conditions produced very favorable results.

While the excellent reports of these operations received wide attention, they were regarded more as a fortunate circumstance than a general possibility and did not immediately lead to the adoption of refrigeration by mills located in areas where well water was not available.

Centrifugal Machines Brought New Concepts to Mills

The development of the centrifugal refrigeration machine in 1920 has proved to be an important factor making the application of refrigeration to textile operations practical. The centrifugal refrigeration machine is ideally suited to handling large loads such as are encountered in the textile mill field.

Between 1920 and 1940 the extensive development and application of centrifugal refrigeration systems to various air conditioning and refrigeration requirements resulted in a substantial decrease in the unit cost of large capacity systems. Reduction in machine cost coupled with increased acceptance of the air conditioning idea by potential users has rendered practical the application of refrigeration in the textile industry.

During the Second World War, many of the aircraft plants were equipped with refrigeration. This was largely the result of war measures which made it mandatory from

a security standpoint to operate with closed or blacked out windows or preferably in windowless buildings. In these plants, which generally did not have the heat load which is ordinarily found in textile mills, it was determined that considerably less air was required for control of comfort by ventilation if refrigeration was installed to maintain low inlet air temperature.

What 'Blackout' Plants Proved

In many cases, the saving from reduction of the size of the air handling system was sufficient to pay for the cost of the refrigeration cycle and to justify the allocation of critical material and equipment for this use.

Although by 1941 refrigeration had not been adopted by any of the yarn processors or weaving mills handling synthetic fibers (except in a few applications in winding and warping rooms which were of little significance), refrigeration had long been found to be economically desirable if not absolutely essential by many of the prime manufacturers of synthetic fibers.

The extensive use of refrigeration in war plants as well as by prime manufacturers of synthetic yarns further influenced the textile industry toward giving the use of refrigeration serious consideration.

In 1942 the management of one of the leading textile mill groups authorized a study of its operations to determine how temperature and humidity conditions could be improved. This action was motivated by management appreciation of the fact that a textile mill by and large was a relatively uncomfortable

(Concluded on next page)

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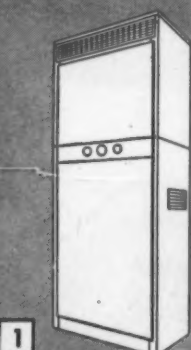
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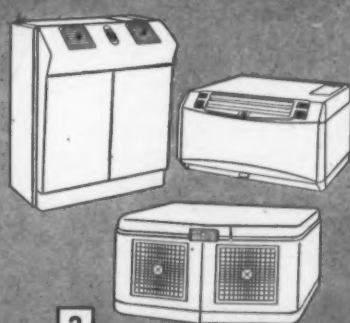


Refrigeration and Air Conditioning

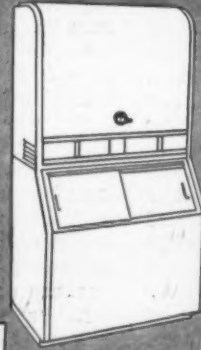
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Air Conditioning for Plant Workers--

(Concluded from preceding page)

place to work. Furthermore, machinery had been steadily speeded up and improved and more machines could be operated by the same worker.

With increased efficiency of machines and increased work load it became more and more important to employ the highest class help. To attract these persons it was desirable to maintain working conditions superior to those offered by competitive industries or competitive plants in the textile industry. Also since this personnel was paid more, it became essential to maintain conditions affording optimum working efficiency.

Very little was known about the improvement in machine operation or in the handling of fibers themselves which might be experienced under constant temperature conditions. It had long been recognized that in cotton textile mills, a constant relative humidity was mandatory.

But the introduction of new synthetic fibers such as viscose, acetate, aroclac, and nylon, which are all essentially plastics, suggested the possibility that greater operating efficiency might be attained with constant temperature control. While the full fashioned hosiery knitting industry had thoroughly accepted complete air conditioning, this did not establish a precedent for the yarn and weaving mills because it was obvious that the length of frame and close setting of needles on fine gauge knitting machines made temperature control essential.

None of the conventional machines used for spinning yarn or weaving

cloth could be as badly thrown out of adjustment by expansion and contraction due to fluctuations in temperature. There was some feeling, however, that efficiency of the modern high speed loom could be improved if a constant temperature were maintained. In any event, it was conceded that constant temperatures would certainly afford improvement in mill machinery operations even though it was recognized that the value of this improvement could be qualified only by extensive experience.

See Benefits to Machines

Incidentally, this general phase of the investigation is, of necessity, still incomplete, but there is mounting evidence that removal of the temperature variable may prove even more beneficial to machine operation and fiber processing than had been hoped.

During the course of the study one southern textile mill installed an air conditioning system with refrigeration. Little could be learned from this installation as to the possible production advantages resulting from constant temperature control as the air distribution was faulty with the result that uniform temperature conditions could not be maintained.

However, it was designed to cool to 80° F. d.b. and 60% relative humidity and investigation indicated that this was on the cool side for workers who were acclimated to and dressed for weather conditions normal in the summer in that part of the country.

In a weave room or a spinning room (and undoubtedly even in a full fashioned hosiery mill, in spite of the fact that the hosiery industry has standardized on a dry bulb temperature of 80° F. and a relative humidity of 50%) it makes little difference what temperature is maintained from the standpoint of machine operation. The important thing is to have the machine set for operation at a certain temperature and to maintain the selected temperature constantly.

Workers' Health and Comfort Primary Consideration

It is thus apparent that the selection of maintained temperature should be based primarily upon its effect upon the health and comfort of the workers in the plant. As the heat load in textile mills is of relatively high magnitude (a moderate size plant will require up to a thousand tons of refrigeration), it is obvious that we cannot afford to be careless or over conservative in the selection of equipment and that every effort must be made to minimize operating hours to keep operating costs in line. Thus it is important to maintain as high a temperature within mill areas as will be considered satisfactory to the workers.

An intensive study of the research data published by the American Society of Heating and Ventilating Engineers, The Harvard School of Public Health, Cornell University, and other authorities on the effect of temperature humidity on human health and comfort brought forth the following facts:

(1). For an average subject engaged in light work the body's metabolic rate starts to increase with

a rise in effective temperature above 79° F. This point correlates very well with the inception of the rise in body temperature above normal. This is inimical to the best interests of the body which would dictate that with a rise in body temperature the metabolic rate should decrease. While this condition is significant, it should be noted that this rise does not begin for average subjects until the effective temperature exceeds 79° F., a condition well above the normally accepted summer comfort zone of 66° F. to 75° F. effective temperature.

(2). The conclusion which can be drawn from the above fact is that above the normally accepted comfort zone, the body can compensate for increased ambient temperature conditions with no adverse physiological effect and thus, presumably, at full efficiency. For the average subject, working at a metabolic rate of 549 B.t.u./hr., when a condition of 79° F.(ET) is equaled or exceeded, the metabolic rate and body temperature start to rise and the body's physiological efficiency starts to decline.

Higher Temperatures Okay

(3). The reduction in efficiency is progressive and increases with the length of exposure. At 85° F.(ET) and at the same rate of light, after an eight hour exposure, the body temperature of the average subject could be expected to rise .75° F. The temperature of certain subjects would rise as much as 1.2° F. This rise in body temperature would not be expected to have a deleterious effect on the average worker in good physical condition and acclimated to conditions in hot industries.

However, at 85° F.(ET) the average subject's physical efficiency has been materially reduced and continued exposure to this condition might have more serious physical effect upon those subjects not in the best condition. Therefore, 85° F.(ET) should be the limit of heat to which the average worker should be subject for an eight hour shift without rest.

(4). At 90° F.(ET) the body temperature of the average subject will rise as much as 2° F. on relatively short exposure and work under these conditions for periods longer than one hour would undoubtedly hazard serious effect on the health of the average worker.

What Is Best Effective Temperature?

On the basis of this data we believe the following conclusions to be reasonable:

(1) The effective temperature in a textile mill should not exceed 80° F. on an eight hour exposure for maximum efficiency of the worker.

(2) Conditions of 85° F.(ET) or above will not be injurious to the health of the average worker in good physical condition, but could bring about undesirable physiological reactions in those below physical par. Furthermore, conditions at or above this effective temperature undoubtedly result in serious impairment of physical or working efficiency of the average worker.

It is interesting to note that the research department of the Textile Worker's Union of America, Branch of the CIO, published a paper dated August, 1948 in which they examined the same data which we examined and recommended maintaining 80° F.(ET). This recommendation was based upon their judgment that the worker's health would be injured when the effective temperature exceeded 80° F.

We do not believe this stand can be justified by the data which they have cited. We found nothing presented in this literature to indicate that there would be any permanent injury to the health of the average worker at effective temperatures not exceeding 85° F.

However, we do agree with them to this extent; that for the maximum efficiency and reasonable comfort of workers it is desirable to maintain an effective temperature not exceeding 80° F.

An effective temperature of 80° F. corresponds to a dry bulb of 86° F. and a relative humidity of 60%. A dry bulb of 80° F. with a relative humidity of 60% gives an effective temperature of 75° F.

Due to the high internal heat load and the fact that windows are eliminated in most modern textile mills, it makes relatively little difference percentage-wise in the gross refrigeration load whether we maintain 75° F. or 80° F.(ET). The tonnage

of a given refrigeration system will increase slightly as the water temperature is increased, but the change is of very small magnitude.

The important consideration is the power required to drive the refrigeration compressor which is more directly affected by temperature and the number of hours and percent of maximum rated capacity at which it is necessary to run the machine both of which latter factors are related to the difference between inside maintained and average outside wet bulb temperatures.

With a straight evaporative cooling system an effective temperature of 80° F. which is 86° F. d.b. at 60% relative humidity can be maintained when the outdoor wet bulb 71° F. or below or with the addition of refrigeration as necessary to maintain a 71° F. dewpoint temperature.

Effect on Machine Loading

With refrigeration, by using all outside air, as the wet bulb rises above 71° F., the loading on the refrigeration machine is merely the difference between the outside wet bulb temperature and the maintained wet bulb temperature or dewpoint at the apparatus which, in this case, would be 71° F.

When maintaining the aforementioned condition within the mill area the wet bulb in this area is 75° F. When the outside wet bulb reaches this temperature or exceeds it, it is customary practice to close the outside air dampers and to operate with full recirculation, so that it may be said that the maximum load on a refrigeration system is established by a 75° F. w.b. condition plus whatever allowance is made for leakage of higher wet bulb air through the outside air dampers.

It can thus be seen that we do not reach a maximum loading on the refrigeration machine until an outside wet bulb temperature of 75° F. is reached or exceeded.

To maintain 75° F.(ET) in the mill, i.e., 80° F. d.b. at 60% r.h., would require an apparatus dewpoint or wet bulb of 65° F. Under these conditions the final wet bulb maintained within the space would be approximately 69.5° F. With this operation it can be seen that it will be necessary to use refrigeration whenever the outside wet bulb temperature exceeds 65° F. and that 100% of the capacity of the refrigeration plant will be required whenever the outside wet bulb reaches or exceeds approximately 69.5° F.

Thus, to effect approximately a 5° F. reduction in effective temperature within the mill area would require 100% of the capacity of the refrigeration plant for this latter described operation well before it would be necessary even to start the refrigeration plant with the first described operation.

Where Costs Enter In

Those familiar with the trend of average outside summer wet bulb temperatures for this southeastern area can immediately see what a tremendous penalty in operating hours and increase in average capacity percentage would be imposed upon the plant by operation at the reduced effective temperature.

It should be recognized that the foregoing analysis is based upon straight air systems not employing any supplementary atomization. This simplified example is used because it graphically presents the penalty involved in the maintenance of reduced effective temperatures.

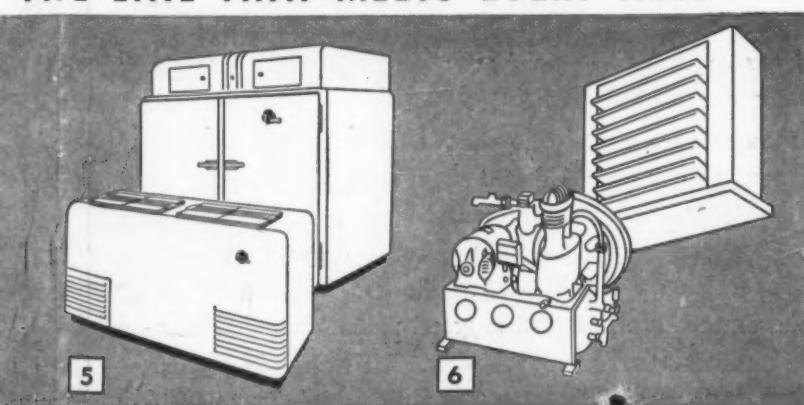
The more customary approach in practical applications is to use air systems with supplemental evaporation within the mill area. Benefits in reduced system size and first cost dictate this procedure. Complete analysis of the basic psychrometric considerations of this procedure has been presented before engineering groups in this area and has been published and so will not be repeated. However, the general effect of reduced effective temperature maintenance in increasing operating hours is carried out in about the same percentage relationship as would be indicated by the analysis presented here.

The technical evidence to the effect that 80° F.(ET) couples conditions of optimum worker efficiency with conditions of minimum practical operating costs leads up to the continued recommendation that 80° F.(ET) be accepted and established as the criterion for the maintenance of textile mill interior conditions under summer conditions.

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'Spring Is Here!'

(Concluded from Page 1)

war ballyhooed type, which do not have all of these features. The air conditioning engineer does therefore not need to compromise his ideas with respect to quality air conditioning when he sells a room air conditioner. Now we recognize that air conditioning engineers are not always good specialty salesmen—maybe they don't even know how to sell—but as far as the product is concerned, the air conditioning engineer need have no qualms about selling a room air conditioner to his best friend, his mother-in-law, or he might even buy one for himself.

As a dealer, or as a salesman, you have been told how to prepare for the PRESENTATION, make the APPROACH, DEMONSTRATE, CLOSE, and CALL BACK in order to make use of users.

The sales promotional support which has been promised you and is being given you and will be given you during this 1949 selling season will include publicity support, the use of testimonials, direct mail to weeded and culled prospect lists, telephone and telegraph solicitation, and each dealer showroom will have an operating room air conditioner on display to help plug the features of XYZ room air conditioner.

You have also had it drummed into you that room air conditioners will pay their way in commercial businesses, such as:

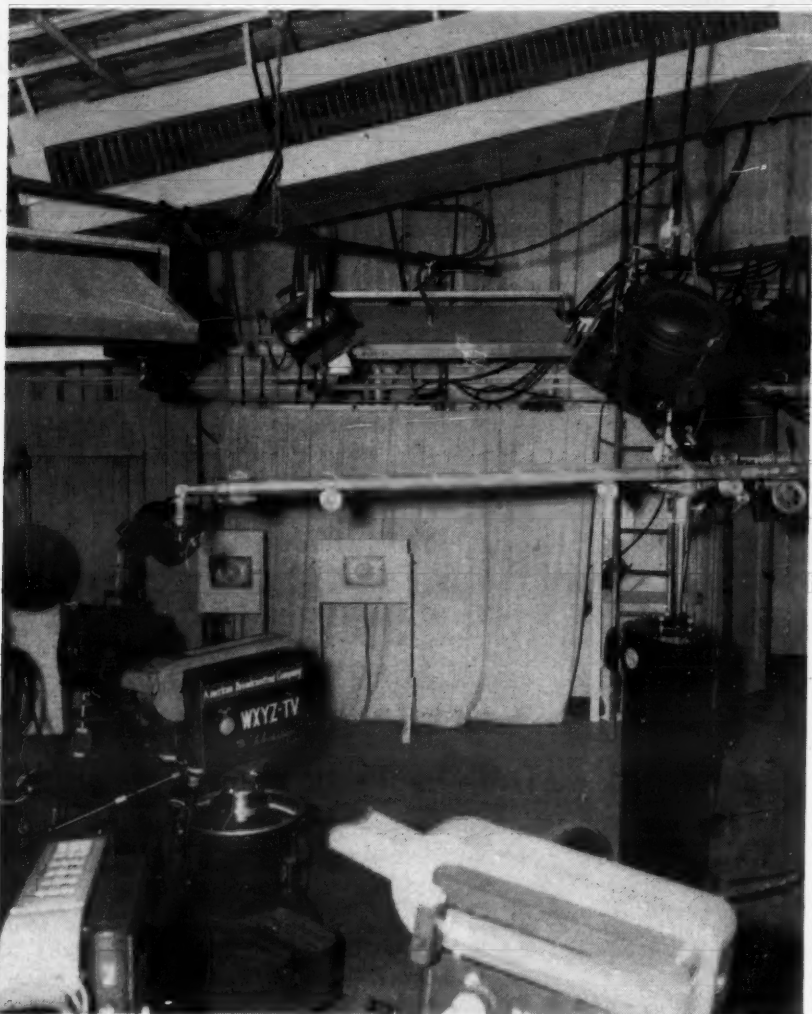
- (a) Business and professional offices—the doctor, the lawyer, the dentist
- (b) In hotels
- (c) In hospital offices and private rooms
- (d) In apartment houses.

Also, a man or woman does not have to have either hay fever or asthma or both to benefit from the use of a room air conditioner at home.

When speaking of prospects, why not take a trip to the nearest curbstone and take a look up and down the street. If there are any tall buildings there, or if they are merely residences or converted residences being used for professional offices, you will see the rear end of some room air conditioners projecting out from the windows. It's all right to deduct the frosted opaque glass windows, which may be frosted for a reason, and you can also deduct the windows in the elevator shafts, if there are any, but there are still some windows left into which some room air conditioners can be fitted this summer even at your curbstone. You don't have to go far to find prospects. Not all of the office buildings, and not all of the hotels, and not all of the hospitals which you can see from your curbstone are completely air conditioned with central systems. And there are even cases where room air conditioners can be sold in completely air conditioned buildings because they seldom take care of remotely located spaces, such as offices of building managers, or building superintendents, offices of chief engineers, and other such areas which are too remote from the central system to justify a separate set of supply and return ducts for the isolated space.

The room air conditioner business is a good business, and you will get inquiries and you will make sales without digging up prospects on your own hook and promoting. But the man who is going to make 1949 as good as 1948 and the man who is going to make 1949 better than 1948, is going to have to dig in harder, show more initiative, and use all of the notes on the keyboard of that grand piano of air conditioning. It's a grand business when you work at it. All work and no play might make Jack a dull boy, but he won't be dull very long when he has money in his pocket which he put there by working at air conditioning. Yes, Spring is here, and among other things we might do, let us remind ourselves that it's time to go to work.

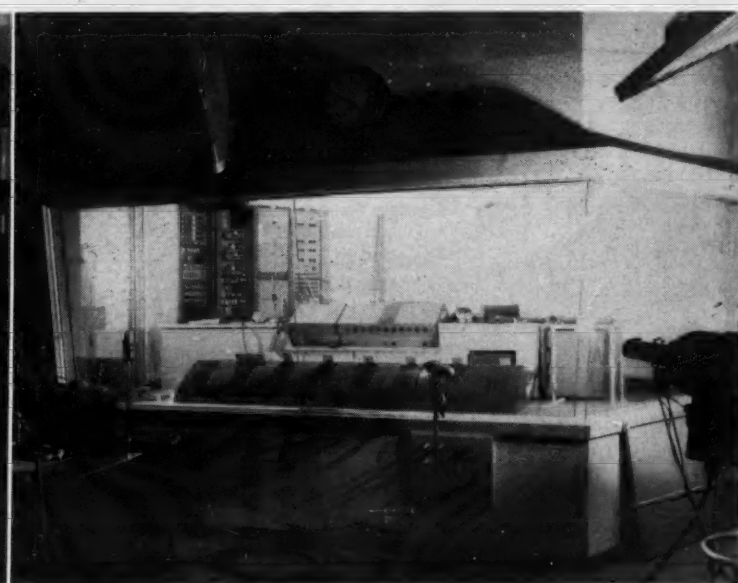
Television Offers New Market (and New Problems) for Air Conditioning



From the large duct at the ceiling huge quantities of cooled air are "dumped" at low velocity into the television studio of WXYZ-TV to cope with the heavy load created by three television cameras, numerous high-powered lights, and actors. It is essential that the noise level be kept at a minimum because the microphones must be kept "out of the picture" and therefore operate at full sound pick-up strength.



LEFT—In the transmitter room a ventilating system is provided to cool the racks of electronic equipment needed to broadcast FM and TV programs. Air is pulled up through the racks in the background and is fed into the duct at top by the round risers. RIGHT—During an actual studio television program this studio control room is crowded with engineers, the program director, actors' coaches, plus representatives from the advertising agency and the sponsor, making the cooling problem a difficult one.



Cooling System for TV Studio Must Handle Heavy, Sudden Loads at Low Noise Level

By C. Dale Mericle

DETROIT—Television—that amazing infant industry which almost overnight has developed into a big business—means increasing opportunities for the air conditioning engineer and contractor.

It also means increasing problems.

Television is no simple subject even for the electronics engineer, and questions which confront the air conditioning expert when he prepares to lay out a cooling plant for a television studio and transmitter are somewhat different from those for which he ordinarily finds the answers.

For one thing, there's no background of experience or literature to guide the contractor. For another, television practice and studio design change with almost every new station.

'System Was Obsolete Before It Was Finished'

That's why one Detroit contractor said, when he completed air conditioning a new television station here a few weeks ago, "The system was obsolete before it was finished."

That statement can't be taken literally, of course, but it does point up the fact that much has yet to be learned about this subject.

And it will probably be learned in a hurry, for television stations are mushrooming all over the country, being built not only by independents but by such radio chains as the American Broadcasting Co., whose new Detroit studio was air conditioned by the above contractor.

As owner of station WXYZ in Detroit, ABC a few weeks ago completed new television and frequency modulation transmitting facilities on the top floor (the 15th) of an office building in midtown Detroit.

Here, in rather confined quarters, air conditioning equipment of 30 tons capacity plus extensive ventilating equipment was installed for WXYZ-TV and FM by Lewis Engineering Service, sub-contractor to the Austin Co., who was responsible for the design and construction of the television studio.

This job was done in a hurry, too, and altogether, counting the very expensive television equipment, lights, studio, aerial mast, and air conditioning, represents an investment of close to a million dollars.

Air conditioning, it should be emphasized, is not a luxury for a television studio, it is a must. Actors and other performers being televised must work under a battery of high-powered lights that give off plenty of sensible as well as radiant heat. Television cameras themselves—and there may be three or four working in a studio at a time—also produce considerable heat. To keep the actors reasonably comfortable and to prevent the grease paint and make-up from streaking, air conditioning is absolutely essential.

The problem here is probably more critical than on movie sound stages, where conditions are quite similar. There's at least one major difference, however. If things get too rough when shooting a movie scene, the di-

rector can always shout "Cut."

With television, though, the performance can't be interrupted.

Besides the problem of keeping people cool, television studios and transmitters house large racks of expensive electronic equipment which give up tremendous quantities of heat in operation. Successful functioning of the many tubes, condensers, and the like, as well as the technicians in the same rooms, calls for cooling, or at least dissipation of the heat that is generated.

Cooling, Ventilating Used

In the WXYZ-TV station, the latter problem is handled largely by ventilation, while the studio and its control room are cooled by means of two 15-ton Curtis air conditioning units.

The television studio at this station measures approximately 33 ft. by 39 ft. in size, including the control room, with a sloping ceiling 18 ft. high at its peak. The control room occupies one corner of the studio, being separated from it by a double-pane thickness of glass.

In the control room during the televising of a studio performance sit the engineers, program director, and coaches. These two rooms are the only ones supplied with comfort cooling.

Two other main rooms in the station—the projection room where movies are televised, and the transmitter control room where TV and FM are fed into the 287-ft. aerial tower directly above on the roof—are ventilated but have no comfort cooling.

The air conditioning and ventilating equipment is housed in a narrow room 10 ft. wide by about 50 ft. long. Here very compactly installed are two 15-hp. Curtis packaged air conditioners, model FWH-1500, two Type R UsAirco 15-ton two-stage evaporative condensers connected to the two "Freon-12" conditioners, two G-E HDH-150A ceiling-mounted ventilating units for cooling the TV and FM equipment, and a Buffalo Forge water cooling unit which cools the final transmitter tubes for the station.

Installation Is Compact

If that seems like a lot of equipment in a small space, we can also mention the large relay box for the station's interoffice telephone system, a movie projector and screen for previewing and editing television films, two tables, a few chairs, and some extra Klieg lights.

"If you think it's crowded now, you should have seen the room when they had 40 men up here installing the equipment," says Dan Lewis, head of the air conditioning contracting firm.

The air handling system, as laid out by Emil Stewardson, Lewis' chief engineer; L. C. Buddenhagen, the sheet metal man; and Austin and ABC engineers, operates as follows:

Fresh and recirculated air are delivered to a mixing box in the machinery room and thence to the air conditioning units. Risers from the units carry the cooled air up and across a corridor to another riser and into the main 30-in. by 30-in. supply duct running along one side of the television studio.

Two 48 by 14-in. ducts take off at right angles from the main supply

duct. One extends out in the studio near the ceiling for 20 ft. For the last 8 ft. on each side (and also on the end) are Volocitrol openings for air discharge.

The other duct extends about 16 ft. into the studio and is also fitted with Volocitrol openings. Total Volocitrol discharge area for the two ducts is 44 ft. long by 10 in. high. From the end of this second duct a 25 by 5-in.

duct passes into the studio control room where it discharges through a circular ceiling air diffuser.

Maximum air delivery to the studio is 12,000 c.f.m. when both air conditioners are operating, or 6,000 c.f.m. if only one is in use.

Return air from the studio is pulled up over the corridor between the studio and the machinery room (Continued on next page)

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TV Cameras, Lights, Actors Make Up Load--

(Continued from preceding page)

where a false ceiling was installed to form an extended plenum and thence into the machinery area proper through the mixing box again.

The machinery room itself, incidentally, serves as a plenum for the evaporative condensers. Outside air is pulled into the machinery room

through windows which are faced on the inside with filters, thence into the evaporative condensers from which it is discharged through the roof.

No air is recirculated from the studio control room as the system now operates. Instead, air is pulled up through the electronic equipment

racks and exhausted through the roof by an exhaust fan.

Control of the 30-ton system is handled by a two-step thermostat arrangement which brings first one of the 15-ton conditioners into operation as required, and then the second if needed.

"One unit will handle most of our normal requirements, so that actually the second unit largely serves as standby equipment for peak loads,"

commented Charles Kocher, chief engineer of WXYZ.

The control layout, which was engineered by R. L. Deppman Co., also makes extensive use of motorized dampers throughout the system. These regulate the amount of outside air brought into the system, the amount recirculated, and such functions as bypassing air when only one condensing unit is operating.

This particular system, of course,

is a year-round job, steam coils being placed in each of the two conditioners. The latter were modified to some extent for this job. Often used with water-cooled condensers, the units in this application are connected with evaporative condensers. Compressor manifolding was also altered and Aminco oil separators added to each machine.

Ventilation for the equipment in the transmitter and projection rooms is handled by the two ceiling-mounted G-E units previously mentioned. One unit takes care of the supply, the other handles the exhaust or return air.

Outside and/or recirculated air passes through filters and steam coils and thence into one of the units where it is forced across the corridor to a riser leading to the 54-in. by 18-in. main supply duct extending across the transmitter room. On each side of the far end of this duct (which runs about 18 ft. long) are 4 ft. of 10-in. high Volocitrols which discharge air into the transmitter room.

An 18-in. by 12-in. duct connects into the end of the main duct and carries across the corridor, discharging from the wall into the projection room through a 48-in. by 12-in. grille.

Room Air Exhausted

Projection room air is not recirculated, being directly exhausted by a 10½-in. Air Van power exhaust. An identical exhaust fan serves the adjoining studio control room, as previously mentioned.

Purpose of the system here, as in the control and transmitter rooms, is to cool the equipment racks. The design is such that the air supplied by the ventilating system is pulled from the floor up through the racks to a sheet metal duct directly above, which in turn is connected to the exhaust duct system.

In the projection room, however, the racks for FM and TV (the latter employs separate equipment for sound and picture) are cooled by an exhaust system powered by the second G-E unit.

The necessary ductwork channels the air from the top of the racks back to the exhaust unit in the machinery room where it is recirculated or discharged in accordance with requirements by means of automatic damper arrangements.

Tubes Must Be Cooled

Also of interest is the closed distilled water cooling circuit which is pumped into the transmitter room to cool the two final transmitter tubes in the television transmitter. These tubes, each rated at 5 kw., react critically to high temperatures. They must be kept below 158° F. (70° C.), so they are made with jackets for water cooling.

Incidentally, Kocher of WXYZ points out that comparable tubes employed in standard AM broadcasting are now air cooled, although at first they, too, were water-cooled.

"Television tubes of the same capacity, however, are so much smaller in size that they have to be cooled by water."

The Buffalo Forge unit which handles the water-cooling system is located in a separate compartment at the opposite end of the machinery room from the air conditioning equipment.

Outside air is pulled in across coils for cooling the distilled water, which is circulated through the tubes when the station is in operation. To avoid possible freeze-ups of the system, three 1,500-watt electric strip heaters have been placed under the water tank because no building heat is piped to this room.

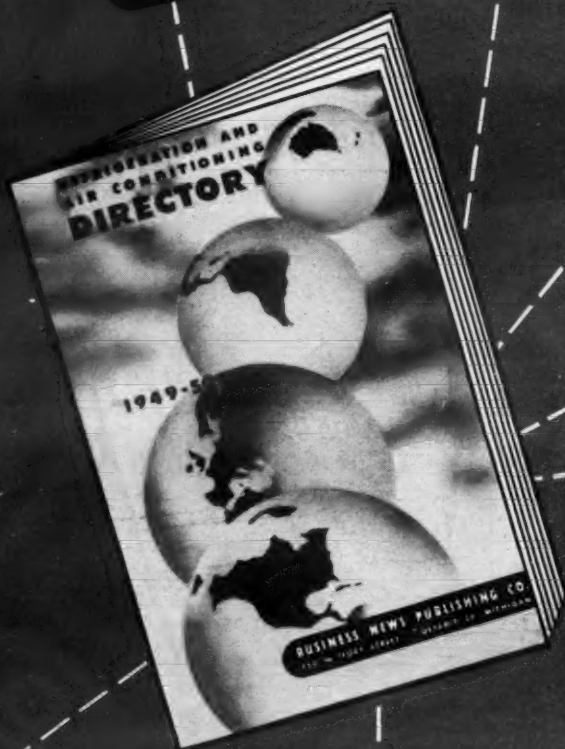
How Unit Is Controlled

A Mercoid with bulb controls the operation of the strip heaters, but the water circulating pump is manually switched on. Fan which pulls outside air across the water coils is controlled by an aquastat, while the damper motor which regulates the amount of fresh air brought in for cooling the water is actuated by a thermostat with its bulb immersed in the air stream. Design calls for maintaining an inside ambient of 75° F., depending, of course, on outside temperature.

Control scheme for the transmitter and projection room ventilating system is based on constant operation of the G-E supply and exhaust units while the transmitter is in use. A major problem is that of preventing too cold outside air being admitted to the system which might damage the electronic equipment.

There are, for example, 49 tubes in (Concluded on next page)

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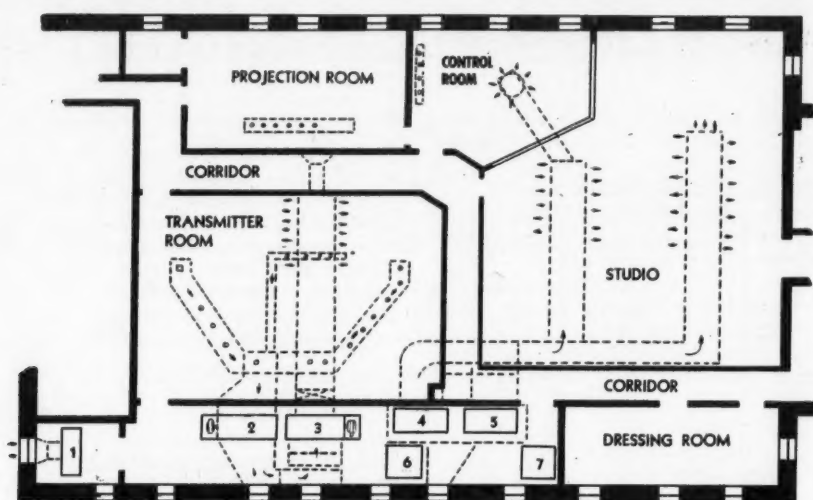
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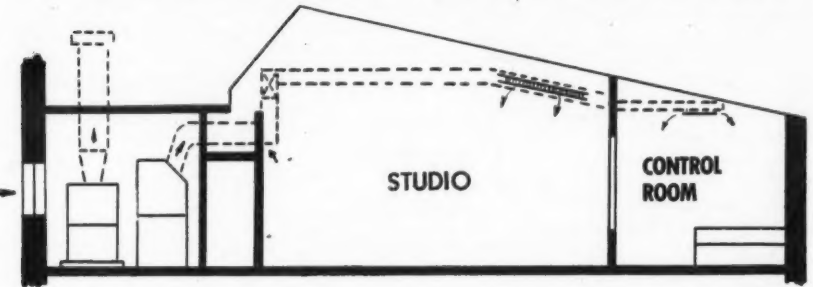
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How Units & Ducts Were Compactly Installed



Plan view of the WXYZ-TV and FM air conditioning and ventilating installation is shown above, while the view below is an elevation indicating how the control room takes off from the studio system. In the machinery room above are (1) Buffalo Forge water-cooling unit for the transmitter tubes, (2, 3) G-E ventilating units for equipment racks, (4, 5) 15-hp. Curtis air conditioning units, and (6, 7) UaAiroc evaporative condensers.



Control Room (Hot & Crowded During Telecast) Probably Needs Own System

(Concluded from preceding page) the FM transmitter and 96 in the TV transmitter.

Main control is a heating thermostat mounted on one of the columns in the transmitter room. This is interconnected with a low limit thermostat set at 50° F. with its bulb located in the supply duct. These two controls, in turn, are hooked up with a steam control valve which admits steam to the heating coils in the G-E unit if necessary, fan motor relays on both the supply and exhaust units, and the motor for the damper which regulates the recirculating or exhausting of return air.

Studio Control System

Cooling and heating control scheme for the studio air conditioning system is a little more involved than for the other systems.

Located in the return air plenum above the corridor which runs between the studio and the machinery room are two thermostatic bulbs, one for the heating thermostat, and the other for the two-stage cooling thermostat.

When the cooling thermostat first calls for cooling it energizes a three-pole relay. The latter starts up the fan motor on one evaporative condenser, opens a liquid line solenoid, and starts the compressor in the No. 1 air conditioner.

Further cooling demands would bring the second air conditioner and evaporative cooler into operation.

The steam-heating coils in the conditioners are brought into operation by a low-limit thermostat set at 50° F., which has its bulb in the common supply duct leading to the studio.

What this air conditioning system is supposed to do, and how it is supposed to do it, have been described somewhat briefly. Now the big question is:

Does it work?

The ventilating system for the transmitter and projection rooms are operating satisfactorily, although the system hasn't been put to the test of a 100° July day yet.

As for the studio air conditioning system, Charles Kocher, the station's

chief engineer, commented that:

"The cooling action in the studio has always been fine."

The control room presents some problems, however. For that matter, the studio presented a number of problems, too.

Chief among these, perhaps, was the fact that the studio load can jump from nothing to several tons with the flick of a switch. The load from lights can be tremendous.

"The average amount of wattage used on a fairly elaborate show," Kocher figures, "can add up to 13,500 watts. We'll have four 1,500-watt 'scoops,' three 2,000-watt 'spots,' and three banks of slimline fluorescents at 470 watts apiece.

"This total of 13,500 can be doubled sometimes, because we may be using two sets for a production alternately, and would keep the lights burning on both."

The sensible light load with 27,000 watts theoretically works out as between 7 and 8 tons of refrigeration. There's considerable load, also, from the three or four television cameras, which are equipped with fans to blow out the very considerable heat generated by their electrical equipment.

Occupants of the studio also add to the load, and then to this can be added the unpredictable radiant heat load from the lights, point out all the engineers involved on this job.

Noise Must Be Low

To the problem of coping with this sudden load must be added the problems of keeping the noise level at a minimum. Explains Kocher:

"In television we usually have to hide the microphone because we don't want it to appear in the scene. This means keeping it far away from the performers in contrast to standard radio practice, and it further means that the mikes must be turned on full strength. Noise level in the studio must be kept at an absolute minimum."

The studio itself is acoustically insulated, he said, with 2 in. of M-K blanket insulation held against the exterior walls with wire netting.

At first glance the appearance of

the studio gives one the impression that it hadn't been finished, but Kocher points out that a TV studio is like a theater stage and the audience sees only the sets and backdrops.

Insulation which serves both an acoustical and thermal purpose consisting of 11-in. thick superfine Fiberglas, has been installed in the studio duct system.

Chief solution to the noise problem and that of coping with a sudden heavy load has been achieved by dumping huge quantities of air at very low velocity into the studio.

With both air conditioning units operating, 12,000 c.f.m. are poured into the studio at a face velocity of 350 f.p.m., Lewis' engineer, Stewardson points out. This represents a complete change of air every 1½ minutes.

Control Room Problem

The studio control room system, however, was not completely satisfactory as originally designed, largely because the problems it presents were unique.

This room, it will be recalled, receives its cooled air from one of the two studio ducts, being delivered to the room from a circular ceiling outlet.

"When we started out, it was figured that the studio would be in operation all the time, and the control room, too. Actually, the studio is used only part of the time but the control room is in almost constant use.

"With WXYZ-TV's mobile transmitter roving around to pick up on-the-spot television events, plus programs from remote locations such as wrestling, boxing, and other sports,

the studio is not used too much of the time.

"Also, we had figured on four to eight people being in the control room during a television program from the studio. Actually, between the engineers, program director, coaches for the actors, sponsors, advertising agency men, and 'friends,' there may be anywhere from 15 to 20 persons in the control room.

"Another thing," Lewis continued, "we designed the system so that air would be pulled up through the equipment racks to cool them and then exhausted through the roof. The engineers, however, have never put the doors on the front of the racks, so the air bypasses most of the equipment. The engineers say they have to get at the equipment quickly and can't be bothered with the doors."

Kocher, the chief engineer, confirms and explains this.

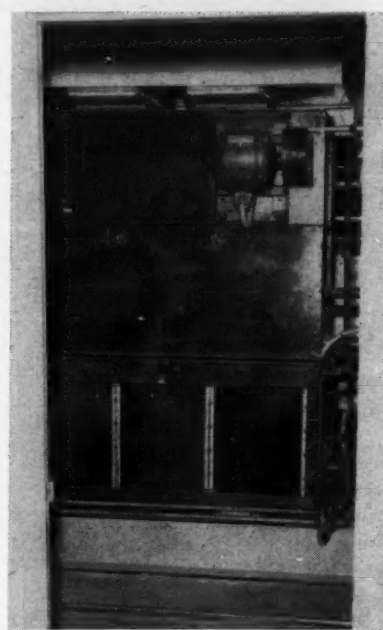
"In the ordinary radio station, we always have standby control and transmitting equipment so that if we have a sudden equipment failure we can easily 'wire around' and keep the station in operation.

"With television, after we've spent the tremendous amount of money necessary to install the transmitter and other equipment we don't have much left for standby equipment. So if something goes wrong we have to fix it immediately. That's why the panels have never been put on."

Kocher also said that now they're trying to keep the number of people in the control room at a minimum, and to keep the door between the control and projection rooms closed so the air circulation system won't be upset.

There are two levels in the studio control room. At floor level facing the studio through the double glass are

Cools Transmitter Tubes



This Buffalo Forge water-cooling unit supplies water for cooling the big television transmitter tubes.

the operators for the eight TV viewing screens. Behind this section is a platform about 2 ft. higher for the transcription turntables and the voice equipment. Here sit more engineers and the program director who runs the show.

The radiant heat hitting those on the second level is quite considerable.

"It's obvious now that the control room should have a separate air conditioning system or a ventilating system where large volumes of air are handled carefully," Lewis concludes.

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ESTIMATED BY: CHERNE
SALESMAN: SHELTON

PROPOSITION No. 533-SY15-40
ORIGINAL DATE JAN. 1, 1945
REVISED DATE
JOB No.

COOLING ESTIMATE

JOB NAME: NO NAME
ADDRESS: ROCHESTER, N. Y.
SPACE USED FOR: 1ST FL. WING R.
SIZE: 75' x 50' = 3750 Sq. Ft. x 9' = 33,750 C.C.

| Item | Quantity | Difference | Factor | Btu/Hour |
|-------------------------------------|----------|----------------------|--------|----------|
| SUNLIGHT GAIN | | | | |
| W. Glass | 269 | Sq. Ft. x 81 | | 21,800 |
| Glass | | Sq. Ft. x | | |
| Skylight | | Sq. Ft. x | | |
| E.W. Wall | 1112 | Sq. Ft. x 20 | | 7,120 |
| S. Wall | 332 | Sq. Ft. x 15 | | 1,600 |
| Roof | | Sq. Ft. x | | |
| TRANSMISSION GAIN | | | | |
| All Glass | 565 | Sq. Ft. x 15 | | 9,670 |
| Skylight | | Sq. Ft. x | | |
| Shade Wall | | Sq. Ft. x | | |
| Roof | | Sq. Ft. x | | |
| Partition | 470 | Sq. Ft. x 10 | | 1,550 |
| Ceiling | | Sq. Ft. x | | |
| Floor | | Sq. Ft. x | | |
| INFILTRATION AND OUTSIDE AIR | | | | |
| Infiltration | 100 | CFM x 15 | | 1,650 |
| Outside Air | 420 | CFM x 15 | | 1,400 |
| INTERNAL HEAT | | | | |
| People | 26 | People x 220 | | 5,720 |
| H. P. | | H. P. x | | |
| Lights | 1800 | Watts x 3.4 | | 6,120 |
| Room Sensible Heat Sub Total | | | | |
| Storage | | Sq. Ft. x | | 56,630 |
| Supply Duct Heat Gain | | % + Supply Duct Loss | | 5,400 |
| Room Sensible Heat | | | | 62,030 |
| ROOM LATENT HEAT | | | | |
| Infiltration | 100 | CFM x 19.5 | | 1,360 |
| Outside Air | 420 | CFM x 19.5 | | 1,150 |
| People | 26 | People x 180 | | 4,680 |
| Steam | | x #/Hr. x 1000 | | |
| Room Latent Heat Sub Total | | | | |
| Supply Duct Latent Loss | | % + Factor | | 360 |
| Room Latent Heat | | | | 7,550 |
| ROOM TOTAL HEAT | | | | |
| Sensible | 420 | CFM x 15 | | 5,520 |
| Latent | | Gr./Lb. x 10.8 | | 4,600 |
| Grand Total Heat Sub Total | | | | |
| Return Duct Heat Gain | | % + Return Duct Loss | | 79,700 |
| Room Total Heat | | | | 2,400 |
| TONS = 6.85 | | | | |
| GRAND TOTAL HEAT | | | | |
| 82,100 | | | | |
| SENS. HEAT FACTOR = 62,030 | | | | |
| Room Sens. = 89 | | | | |
| INDICATED App. D.P. 51.4 | | | | |
| SELECTED App. D.P. 51 | | | | |
| GRAND S.H.P. Grand T.H. | | | | |

| CONDITIONS | D.B. | W.B. | % R.H. | D.P. | Gr./Lb. |
|------------|------|------|--------|------|---------|
| Outside | 95 | 75 | | 66.6 | 98.0 |
| Room | 80 | 67 | | 60.6 | 78.5 |
| Difference | 15 | | | | 19.5 |

SELECTED ROOM CONDITIONS: D.B. W.B. %RH

26 People Not Smoking x 20 CFM/Person = 520

20 People Smoking x 20 CFM/Person = 400

CFM Ventilation = 520

INFILTRATION

Swinging Doors 26 People x 3.7 CFM/Person = 100

Open Doors Doors x CFM/Door =

Exhaust Fan Feet x CFM/Ft. =

Crack Feet x CFM/Ft. =

CFM Infiltration = 100

OUTSIDE AIR THRU APPARATUS = 420

DEHUMIDIFIED AIR

(1-2 B.F.) x (80° Rm. T. - 52° App. D.P.) = 17.6

Room Sens. Room Sens. = 3200

Dehumidifier Rise = 3200

CFM

62030

17.6 Dehumidifier Rise = 3200

CFM

TOTAL AIR CFM

CFM Dehum. x Rise =

* Total Air Rise at Outlet =

CFM

CHILLED WATER

Grand Total Heat = 82,100

* Rise x 500 = 23.5

G.P.M.

Cooled From 54.0° To 47.0°

APPARATUS SELECTION

| Quantity | Conditioner | Compressor | Cooler | Condenser |
|---------------|-------------|------------|--------|-----------|
| Type and Size | 3906 | SYSTEM | | |
| CFM | 3200 | | | |
| No. of Rows | 4 | | | |
| Refrig. Temp. | | | | |
| Suction Temp. | | | | |
| Cond. Temp. | | | | |
| Sub Cooler | | | | |
| G.P.M. | 24 | | | |
| R.P.M. | 940 | | | |
| BTU/Hr. | 1200 | | | |

NOTES

CONDITIONED SPACE ABOVE AND BELOW

CHECK FIGURES

BTU/Hr./Sq. Ft. = Grand Total, Room Sensible

Sq. Ft./Person = Watts/Sq. Ft. =

CFM/Sq. Ft. of Outlet Wall Area = Outlet Velocity =

Air Change = Minutes Outside Air Change = Minutes

Fig. 1 shows the cooling estimate form recommended by Carl Ashley, chief development engineer of Carrier Corp., who contends that a more accurate method of estimating the air conditioning load should be employed.

Use of More Accurate Method To Estimate Cooling Load Is Urged by Veteran Engineer

CHICAGO—Emphasizing the need for a uniform and more accurate method of estimating the summer air conditioning load and selecting equipment to handle it, C. M. Ashley, chief development engineer for Carrier Corp., outlined a method of estimate he has used for 15 years at the recent fifty-fifth annual meeting of the American Society of Heating and Ventilating Engineers held at the Stevens hotel here.

The estimator of a heat load for summer air conditioning customarily starts with certain design conditions, said Ashley. These conditions are usually those for which system performance is to be guaranteed, and include:

- a. Room air temperature and humidity.
- b. Outside air temperature and humidity.
- c. Number of people customarily in the space.
- d. Internal sources of heat and moisture, such as lights, motors, cooking appliances, etc.
- e. Ventilation standards to be maintained (usually in terms of c.f.m. outside air per person).

INFORMATION NEEDED

Information must also be available as to the size of the room and the building construction. From the foregoing information the estimator determines (1) what heat and moisture load must be removed from the space to be conditioned; (2) what additional heat and moisture must be extracted from the ventilation air. Usually, the estimator also knows in advance the general type of air conditioning equipment to be used.

After determining the heat and moisture load of the room, the estimator next has to choose the temperature and humidity of the air to be supplied by the apparatus. He must also select the corresponding air quantity.

The first part of the heat gain of the air is associated with a change of temperature and is generally

termed "sensible heat" . . . The second part of the heat gain is associated with a change of moisture content of the air (humidity ratio) and is commonly known as "latent heat."

Since the same air is used for absorbing both moisture, and sensible heat, the ratio of moisture to sensible heat gain per pound of dry air is the same as the ratio of the moisture to sensible heat gain per pound of dry air.

(Concluded on next page)

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Some Say

"It's a Great Life"

How About You?

Factors Involved In Properly Estimating Air Conditioning Load Outlined by Ashley

(Concluded from preceding page)

ture load to sensible heat load to be absorbed in the room.

In spray type dehumidifiers, the air leaving the dehumidifier is usually saturated and therefore is at the apparatus dewpoint. This simplifies the problem of choosing the correct apparatus dewpoint and air quantity, pointed out Ashley.

"When a coil is used as a dehumidifier, the air normally leaves in a condition less than saturated. This complicates matters, since the estimator must evaluate both the dry-bulb temperature and the moisture content of the air leaving the coil. Moreover, these values are influenced by the condition of the air entering the coil (which may not be at the room condition)."

In this case, it might be assumed that a portion of the air came in contact with the coil surface and was reduced to the condition of the apparatus dewpoint, while another portion passed through the coil without any change of condition. The portion assumed to have passed unchanged through the coil is termed the "by-pass" portion. It might be considered as the inefficiency of the coil. The remainder is termed the dehumidified portion.

THE BY-PASS FACTOR

The by-pass factor can be described as the ratio:

leaving air temperature minus coil apparatus dewpoint ÷ entering air temperature minus coil apparatus dewpoint

The concepts of the coil by-pass factor and of the coil apparatus dewpoint have been developed without any relation to the surface temperatures actually existing in the coil. Such a relationship is desirable in solving problems, and was implied in Carrier's 1911 statement of the laws of psychrometry. Later, he and others developed the theory that in any process involving simultaneous transfer of heat and of moisture between air and a wet surface, the transfer of heat and of moisture between the surface and air is in proportion to the respective heads.

In practice, the coil surface temperature is seldom uniform through-

out, particularly where the coil has extended surface on the air side, Ashley declared.

It is possible, however, to assign a single surface temperature as the composite of actual temperatures, which can be considered as the apparatus dewpoint.

As far as possible, outside air for ventilation is brought through the apparatus, in order to reduce to a minimum the direct effect of outside air on the room conditions. This also increases the effectiveness of the air conditioning apparatus, because the entering air is increased in temperature and moisture content above the room conditions.

The ventilation requirements are determined by the sources of air contamination: people, food, etc. Thus, the outside ventilation air for a given job is chosen as a certain flow rate in cubic feet per minute. But the dehumidified air quantity is determined from the air conditions leaving the apparatus and depends upon the room load and the sensible heat factor. Where a saturating type of dehumidifier is used, determining the condition of the air leaving the apparatus is simple, since the air is at saturation and is not affected by the condition of the air entering the coil.

AIR LEAVING COIL

On the other hand, where a coil dehumidifier is used which does not saturate the air, the air condition leaving the coil is a function not only of the effective coil surface temperature and of the coil by-pass factor, but also of the entering air condition. But the entering air condition is unknown until the air quantity passing through the coil is chosen and the percentage of outside air can be determined.

From this dilemma there are three possible avenues of escape which do not involve cut-and-try or approximation: (1) choose the air velocity and depth, i.e., the by-pass factor, of the dehumidifying coil; (2) choose the dehumidified air quantity; and (3) choose the leaving air conditions. The choice which is made is perhaps the most significant difference between estimating methods, as will be shown in a later section. Ashley's choice is

the by-pass factor method.

A typical cooling load estimate made in accordance with the principles outlined here is shown on the cooling estimate form (Fig. 1). The highlights of the estimate are: (1) pre-selection of the outside and room conditions; (2) calculation of the ventilation requirement in terms of air quantity; (3) determination of the by-pass outside air load using the coil by-pass factor determined from the pre-selected coil depth and face velocity; (4) determination of the sensible heat factor and from this, the coil apparatus dewpoint; (5) calculation of the dehumidified air quantity based upon the room conditions, the coil apparatus dewpoint and the coil by-pass factor; and (6) selection of the equipment as determined by the grand total heat and refrigerant temperature.

Huge Refrigeration System for Nitrate Plants In Chile Will Require Several Freight Cars

YORK, Pa.—An order for 680 tons of refrigerating equipment that has a physical weight of 600 tons was recently placed with the York Corp. here by the Chilean Nitrate Sales Co. of New York, S. E. Lauer, president of York, has announced.

"The order is the direct result of a similar installation of York equipment made some 20 years ago," Lauer said. "It represents more than \$500,000 worth of refrigerating equipment."

"This order will include eight cylindrical tanks 30 ft. high and 10 ft. in diameter. When transported from York to shipboard, each tank

will occupy a full length railway car and extend 2 ft. over the width of the car.

"Each tank will have approximately 15,000 ft. of 2-in. tubing.

"When installed in Chile, the equipment will be employed to make possible the economical production of nitrate crystals for the fertilizing and chemical industries."

Lauer also noted that the York consumer sales division has booked an order from the General Accounting Office of the U. S. Government in Washington, D. C. for the installation of four York turbo systems with a capacity of 4,200 tons.

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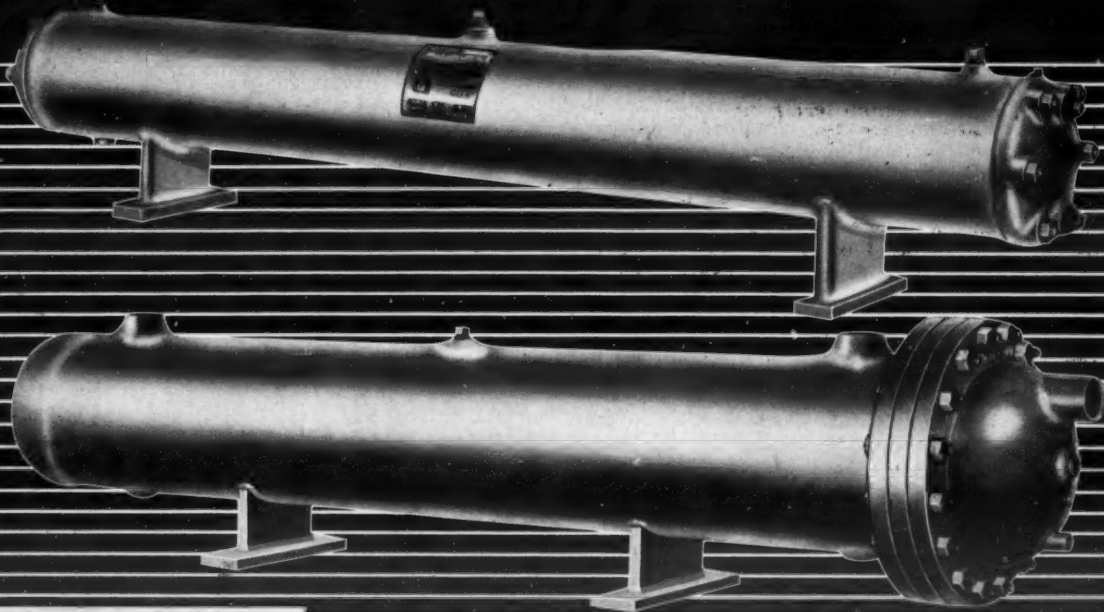
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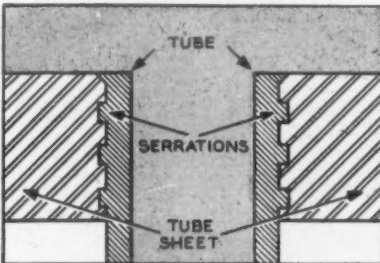
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The diagram above shows how the tube wall is forced into serrations, or grooves, in the tube sheet when the tube is rolled in. A leak-proof junction between tube and sheet is thus effected.

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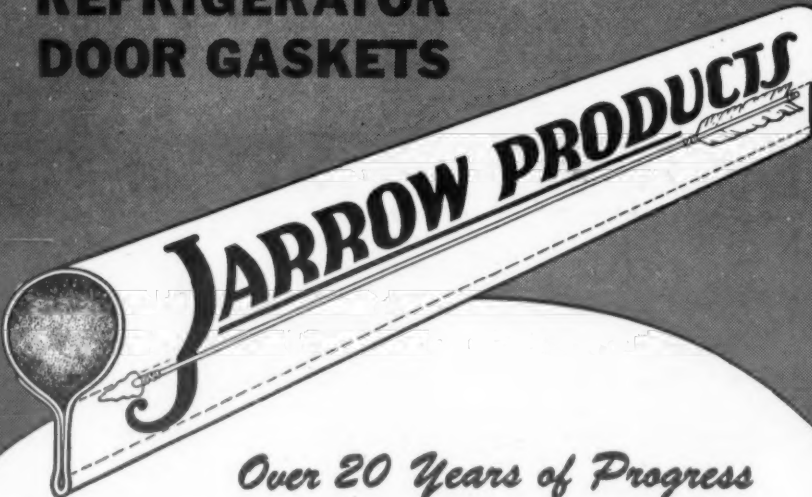
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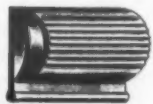
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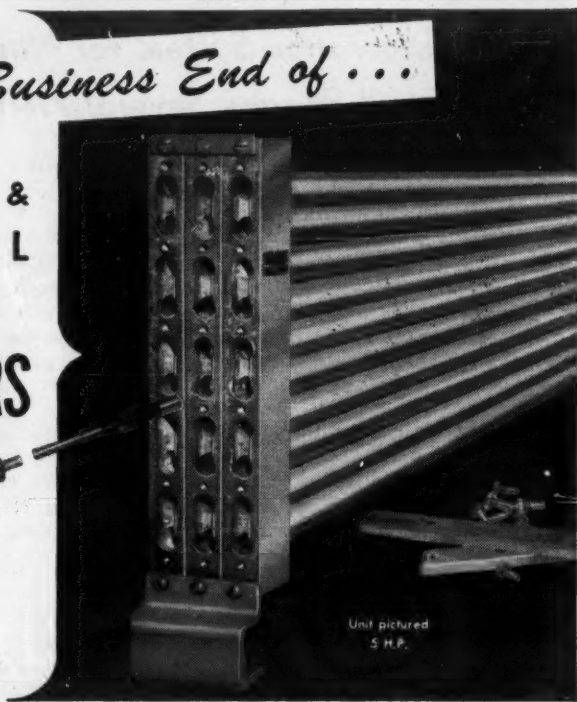


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The KEY to AIR CONDITIONING

by James J. LaSalvia

Readers who have any questions regarding the application of air conditioning are invited to write to Mr. LaSalvia, the author of this series, who will be pleased to furnish a complete and detailed answer free of charge. This is another of the services provided by the News.

Piping Refrigerant, Water, Steam (Cont.)

WATER PIPING

In general, water piping is required for the following purposes in air conditioning:

1. Cold water supply from water cooler or well to water-cooling coils or washer.
2. Cold water return from water-cooling coils or washer to water cooler return of well water back to the ground.
3. City or well water for condensing purposes to the condenser and return from condenser to sewer.
4. City water for spraying in the air stream for humidification.

5. Drain lines from various equipment to the sewer.

Water lines should be properly supported. All piping should be in-

stalled as short as possible and with fewest number of fittings in order to avoid unnecessary frictional losses.

A centrifugal pump is required to pump cold water from a water cooler to water-cooling coils.

The water piping, water coils, and pump become the water circulating system.

For a water circulating system, there are certain points which must be considered:

- a. The piping shall not be supported by the pump.
- b. Never use piping smaller than what is required at the suction and discharge side of pump. It is good practice to use piping on the suction side, one to two sizes larger than required at the pump.
- c. The colder the water, the better is the suction lift of the pump. Ordinarily, with water temperatures up to about 120° F. the working suction lift (including all friction losses) should not exceed 15 ft.
- d. When a pump is to handle hot

(Continued on next page)

Table 5—Friction of Water In Pipes

Loss of Head In Feet Due to Friction,
Per 100 Ft. of Ordinary Iron Pipe

| Gallons Per Minute | Size of Pipe | | | | | | | | | |
|--------------------------|--------------|-------|------|-------|------|-------|------|-------|-------|-------|
| | 1/4" | | 3/8" | | 1/2" | | 3/4" | | 1" | |
| | Vel. | Fric. | Vel. | Fric. | Vel. | Fric. | Vel. | Fric. | Vel. | Fric. |
| 1 | 3.08 | 28.0 | 1.67 | 6.4 | 1.05 | 2.1 | | | | |
| 2 | 6.16 | 103.0 | 3.35 | 23.3 | 2.10 | 7.4 | 1.20 | 1.9 | | |
| 3 | | | 5.02 | 49.0 | 3.16 | 15.8 | 1.80 | 4.1 | 1.12 | 1.26 |
| 4 | | | 6.70 | 84.0 | 4.21 | 27.0 | 2.41 | 7.0 | 1.49 | 2.14 |
| 5 | | | | | 5.26 | 41.0 | 3.01 | 10.5 | 1.86 | 3.25 |
| 7.5 | | | | | 8.0 | 87.0 | 4.51 | 22.4 | 2.79 | 7.14 |
| 10 | | | | | | | 6.02 | 38.0 | 3.72 | 11.7 |
| 15 | | | | | | | 9.02 | 80.0 | 5.60 | 25.0 |
| 20 | | | | | | | | | 7.44 | 42.0 |
| 25 | | | | | | | | | 9.30 | 64.0 |
| 30 | | | | | | | | | 11.15 | 89.0 |

| Gallons Per Minute | Size of Pipe | | | | | | | | | |
|--------------------------|--------------|-------|--------|-------|-------|-------|--------|-------|------|-------|
| | 1 1/4" | | 1 1/2" | | 2" | | 2 1/2" | | 3" | |
| | Vel. | Fric. | Vel. | Fric. | Vel. | Fric. | Vel. | Fric. | Vel. | Fric. |
| 1 | | | | | | | | | | |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | 0.86 | 0.57 | 0.63 | 0.26 | | | | | | |
| 5 | 1.07 | 0.84 | 0.79 | 0.39 | | | | | | |
| 7.5 | 1.61 | 1.81 | 1.18 | 0.85 | 0.76 | 0.30 | | | | |
| 10 | 2.14 | 3.05 | 1.57 | 1.43 | 1.02 | 0.50 | 0.65 | 0.17 | 0.45 | 0.07 |
| 15 | 3.2 | 6.50 | 2.36 | 3.0 | 1.53 | 1.0 | 0.98 | 0.36 | 0.68 | 0.15 |
| 20 | 4.29 | 11.1 | 3.15 | 5.2 | 2.04 | 1.82 | 1.31 | 0.61 | 0.91 | 0.25 |
| 25 | 5.36 | 16.6 | 3.94 | 7.8 | 2.55 | 2.73 | 1.63 | 0.92 | 1.13 | 0.38 |
| 30 | 6.43 | 23.5 | 4.72 | 11.0 | 3.06 | 3.84 | 1.96 | 1.29 | 1.36 | 0.54 |
| 35 | 7.51 | 31.2 | 5.51 | 14.7 | 3.57 | 5.1 | 2.29 | 1.72 | 1.59 | 0.71 |
| 40 | 8.58 | 40.0 | 6.3 | 18.8 | 4.08 | 6.6 | | | | |
| 45 | 9.65 | 50.0 | 7.08 | 23.2 | 4.60 | 8.2 | | | | |
| 50 | 10.72 | 60.0 | 7.87 | 28.4 | 5.11 | 9.9 | | | | |
| 60 | 12.87 | 85.0 | 9.44 | 39.6 | 6.13 | 13.9 | | | | |
| 70 | | | 11.02 | 53.0 | 7.15 | 18.4 | | | | |
| 80 | | | 12.59 | 68.0 | 8.17 | 23.7 | | | | |
| 90 | | | 14.17 | 84.0 | 9.19 | 29.4 | | | | |
| 100 | | | | | 10.21 | 35.8 | | | | |
| 120 | | | | | 12.25 | 50.0 | | | | |
| 140 | | | | | 14.30 | 67.0 | | | | |
| 160 | | | | | 16.34 | 86.0 | | | | |

| Gallons Per Minute | Size of Pipe | | | | | | | | | |
|--------------------------|--------------|-------|-------|-------|------|-------|------|-------|------|-------|
| | 2 1/2" | | 3" | | 4" | | 5" | | 6" | |
| | Vel. | Fric. | Vel. | Fric. | Vel. | Fric. | Vel. | Fric. | Vel. | Fric. |
| 40 | 2.61 | 2.20 | 1.82 | 0.91 | 1.02 | 0.22 | | | | |
| 45 | 2.94 | 2.80 | 2.05 | 1.15 | 1.17 | 0.28 | | | | |
| 50 | 3.27 | 3.32 | 2.27 | 1.38 | 1.28 | 0.34 | | | | |
| 60 | 3.92 | 4.65 | 2.72 | 1.92 | 1.53 | 0.47 | | | | |
| 70 | 4.58 | 6.2 | 3.18 | 2.57 | 1.79 | 0.63 | 1.14 | 0.21 | | |
| 80 | 5.23 | 7.9 | 3.63 | 3.28 | 2.04 | 0.81 | 1.31 | 0.27 | | |
| 90 | 5.88 | 9.8 | 4.09 | 4.08 | 2.3 | 1.0 | 1.47 | 0.34 | | |
| 100 | 6.54 | 12.0 | 4.54 | 4.96 | 2.55 | 1.22 | 1.63 | 0.41 | 1.14 | 0.14 |
| 120 | 7.84 | 16.8 | 5.45 | 7.0 | 3.06 | 1.71 | 1.96 | 0.57 | 1.42 | 0.25 |
| 150 | 9.8 | 25.7 | 6.81 | 10.5 | 3.83 | 2.60 | 2.45 | 0.87 | 1.71 | 0.36 |
| 175 | 11.46 | 34.0 | 7.96 | 14.0 | 4.45 | 3.36 | 2.86 | 1.18 | 2.00 | 0.48 |
| 200 | 13.07 | 43.1 | 9.08 | 17.8 | 5.11 | 4.37 | 3.27 | 1.48 | 2.28 | 0.62 |
| 225 | 14.71 | 59.0 | 10.17 | 22.3 | 5.62 | 5.61 | 3.67 | 1.86 | 2.57 | 0.74 |
| 250 | | | 11.44 | 27.1 | 6.40 | 6.72 | 4.08 | 2.24 | 2.80 | 0.92 |
| 275 | | | 12.49 | 32.3 | 7.03 | 7.99 | 4.50 | 2.72 | 3.06 | 1.15 |

| Gallons Per Minute | Size of Pipe | | | | | | | | | |
|--------------------------|--------------|-------|-------|-------|-------|-------|-------|-------|------|-------|
| | 3" | | 4" | | 5" | | 6" | | 8" | |
| | Vel. | Fric. | Vel. | Fric. | Vel. | Fric. | Vel. | Fric. | Vel. | Fric. |
| 300 | 13.62 | 38.0 | 7.66 | 9.38 | 4.90 | 3.15 | 3.40 | 1.29 | 1.90 | 0.36 |
| 350 | 15.89 | 50.5 | 8.90 | 12.32 | 5.72 | 4.19 | 3.98 | 1.69 | 2.20 | 0.41 |
| 400 | | | 10.20 | 15.82 | 6.54 | 5.35 | 4.54 | 2.21 | 2.60 | 0.56 |
| 450 | | | 11.50 | 19.74 | 7.35 | 6.65 | 5.12 | 2.74 | 2.92 | 0.64 |
| 500 | | | 12.77 | 24.08 | 8.17 | 8.12 | 5.60 | 3.26 | 3.20 | 0.81 |
| 550 | | | | | 8.99 | 9.66 | 6.16 | 3.93 | 3.52 | 0.98 |
| 600 | | | | | 9.80 | 11.34 | 6.72 | 4.70 | 3.84 | 1.16 |
| 650 | | | | | 10.62 | 13.16 | 7.28 | 5.50 | 4.16 | 1.34 |
| 700 | | | | | 11.44 | 15.12 | 7.84 | 6.38 | 4.46 | 1.54 |
| 750 | | | | | 12.26 | 17.22 | 8.50 | 7.00 | 4.80 | 1.74 |
| 800 | | | | | | | 9.08 | 7.90 | 5.12 | 1.97 |
| 900 | | | | | | | 10.30 | 10.11 | 5.75 | 2.46 |
| 1,000 | | | | | | | 11.32 | 12.04 | 6.40 | 3.02 |

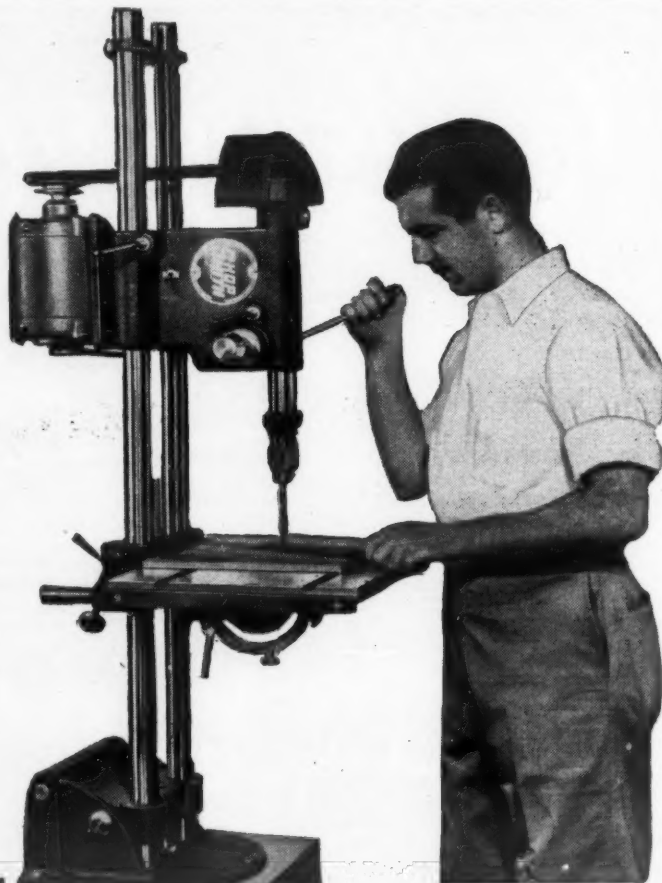
Vel.—Velocity feet per second. Fric.—Friction head in feet.

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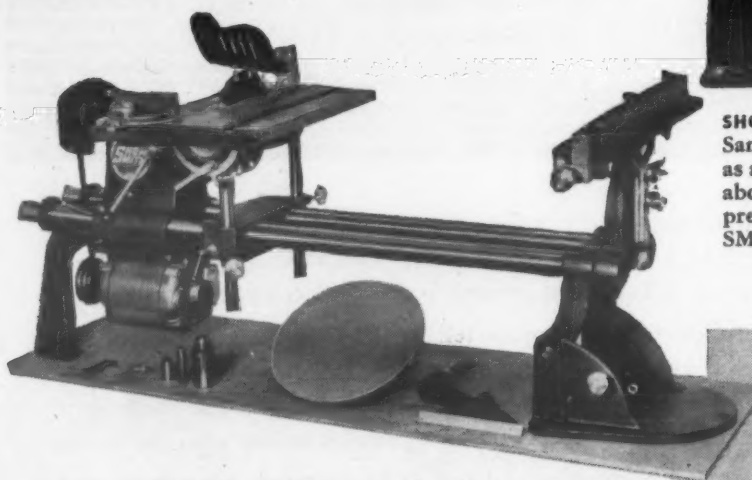
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Table 6—Friction of Water in Fittings and Valves

| | Equivalent Number of Feet of Straight Pipe Size of Fittings and Valves | | | | | | | | | | | | | | | |
|-------------|---------------------------------------------------------------------------|------|------|------|------|--------|--------|------|--------|------|------|------|------|------|------|-----|
| | 1/4" | 3/8" | 1/2" | 3/4" | 1" | 1 1/4" | 1 1/2" | 2" | 2 1/2" | 3" | 4" | 5" | 6" | 8" | 10" | |
| 90° Elbow | 3.0 | 4.0 | 5.0 | 6.0 | 8.0 | 10.0 | 12.0 | 14.0 | 16.0 | 18.0 | 24.0 | 30.0 | 36.0 | 48.0 | 60.0 | 30 |
| 45° Elbow | .25 | .35 | .5 | .7 | 1.0 | 1.2 | 1.4 | 1.8 | 2.3 | 2.8 | 3.7 | 4.6 | 5.5 | 7.4 | 9 | 9 |
| Tee | 1.8 | 2.7 | 3.5 | 5.3 | 7.0 | 8.8 | 10.6 | 14.1 | 17.6 | 21.1 | 28.2 | 35.2 | 42.3 | 56.4 | 70 | 70 |
| Gate Valve | .33 | .5 | .85 | 1.0 | 1.3 | 1.6 | 2.0 | 2.6 | 3.3 | 3.9 | 5.2 | 6.5 | 7.8 | 10.4 | 13 | 13 |
| Globe Valve | 3.0 | 4.4 | 5.9 | 8.8 | 11.8 | 14.6 | 17.6 | 23.4 | 29.3 | 35.2 | 46.9 | 58.6 | 70.4 | 93.8 | 117 | 117 |
| Check Valve | 2.7 | 4.0 | 5.3 | 7.9 | 10.6 | 13.2 | 15.8 | 21.1 | 26.4 | 31.7 | 42.3 | 52.8 | 63.4 | 84.6 | 105 | 105 |

Water Piping--

(Continued from preceding page)

water at a temperature above 180° F., it is best to check with pump manufacturer for proper performance.

e. If pump should be throttled, always throttle on the discharge side of pump.

f. No centrifugal pump of the conventional type will start pumping unless it is properly primed. It is best practice in all instances in this work to have a flooded or submerged suction at all times, so that priming at no time will be required.

g. For installations where long pipe lines are required and especially where hot water is to be circulated, provisions must be made for contraction and expansion of lines.

h. Water flowing through piping must overcome the friction set up in the pipe.

FRICITION OF WATER IN PIPE AND FITTINGS

Friction of water in pipe and fittings is shown in Tables 5 and 6. These friction tables are for new ordinary pipe of such character as steel, wrought, or cast iron.

For old piping already in place up to about eight years old, you can use the friction data in the tables by increasing the figures 50%.

For new smooth copper and brass piping or tubing, use 50% of the friction as given in the tables.

Velocities in ordinary piping should not exceed 10 ft. per second for good practice.

EXAMPLE

Given 500 g.p.m. to be circulated through a 5-in. pipe 400 ft. long having four 90° elbows and two 45° elbows. What is the friction loss in feet?

Referring to Table 5, 500 g.p.m. through a 5-in. pipe shows 8.12 ft. of friction loss per 100 ft. in length, which is .0812 ft. per foot of length,

and a velocity of 8.17 ft. per second.

For pipe, 400 ft. x .0812 = 32.48 ft. of friction loss.

For a 5-in., 90° elbow, referring to Table 6, it has the equivalent of 18 ft.

4 elbows x 18 ft. = 72 ft.

72 ft. x .0812 = 5.85 ft.

A 5-in., 45° elbow = 5.49 ft.

2 elbows x 5.49 ft. = 10.98 ft.

10.98 ft. x .0812 = .89 ft.

Total friction loss = 39.22 ft.

WATER EXPANSION

Water expansion must be taken care of in systems such as used in this work. These cold water circulation systems are generally of the closed type, and it requires that provisions must be made for the water to expand. The water expansion is taken care of by the use of an expansion tank. This expansion takes place when the water in the system rises in temperature. Horizontal or vertical tanks may be used.

EXAMPLE

Given a closed water system which has a total volume of 4,000 gallons of water, the lowest temperature of the water will be 40° F. and the water will rise in temperature on shut down to 80° F. What size expansion tank should be used?

Referring to Table 7, we learn that:

The specific volume of water at 80° F. = .12020 gals./lb.

The specific volume of water at 40° F. = .11982 gals./lb.

The difference is .00038 gals./lb. 4,000 gals. x 8.3 lbs. x .00038 = 12.62 gals. of water expansion.

12.62 gals. = 1.7 cu. ft.

7.5 gals.

Make 1.7 cu. ft. two thirds of tank.

Therefore, tank volume = 3

— x 1.7 = 2.6 cu. ft.

2

A vertical tank in this case would be 1 ft. dia. and 3 1/4 ft. high.

On top of tank provide an air relief valve and a vacuum breaker.

THE POWER

The power required for pumping is based on the following formulas:

a. Water horsepower (theoretical hp.) =

G.p.m. x Head in ft. x Sp. Gr. x 8.3

33,000

G.p.m. x Head in ft. x Sp. Gr.

3,960

b. Brake hp. (actual hp.) of pump =

G.p.m. x Head in ft. x Sp. Gr.

3,960 x Efficiency of pump

c. Total hp. to be used =

G.p.m. x Head in ft. x Sp. Gr.

3,960 x Eff. of pump x Eff. of motor

Specific Gravity of water is 1.

Efficiency of pump can be taken as 75%.

Efficiency of motor can be taken as 80%.

STATIC HEAD

Static head is the vertical distance in feet between the free level of the source of supply and the point of free discharge, or to the level of the free surface of the discharge water.

For 70° F. water it requires a vertical column of 2.31 ft. of water to create a 1 lb. pressure per square inch. This figure can be used for general practice of water temperature in this work.

TOTAL DYNAMIC HEAD

Total dynamic head is the vertical distance between source of supply and point of discharge when pumping the required capacity, plus friction, entrance, and exit losses.

(To Be Continued)

Table 7—Thermal Properties of Water at Saturation Pressure

| Temp. Fahr. | Pressure | | Specific Volume | | Density | | Conversion Factor |
|-------------|-----------|-----------------|-----------------|------------------|-------------------|---------|-------------------|
| | Lbs. Abs. | Cu. Ft. Per Lb. | Gallons Per Lb. | Lbs. per Cu. Ft. | Grams per Cu. Cm. | Ft./Lb. | |
| 30 | 0.08 | 0.11982 | 0.11982 | 62.42 | 0.99978 | 2.306 | |
| 40 | 0.12 | 0.11982 | 0.11982 | 62.43 | 1.00000 | 2.306 | |
| 50 | 0.18 | 0.11982 | 0.11982 | 62.42 | 0.99973 | 2.306 | |
| 60 | 0.26 | 0.11982 | 0.11982 | 62.37 | 0.99904 | 2.308 | |
| 70 | 0.36 | 0.11982 | 0.11982 | 62.30 | 0.99799 | 2.311 | |
| 80 | 0.51 | 0.11982 | 0.11982 | 62.22 | 0.99663 | 2.314 | |
| 90 | 0.70 | 0.11982 | 0.11982 | 62.11 | 0.99498 | 2.318 | |
| 100 | 0.95 | 0.11982 | 0.11982 | 62.00 | 0.99307 | 2.322 | |
| 110 | 1.27 | 0.11982 | 0.11982 | 61.66 | 0.99093 | 2.327 | |
| 120 | 1.69 | 0.11982 | 0.11982 | 61.71 | 0.98857 | 2.333 | |
| 130 | 2.22 | 0.11982 | 0.11982 | 61.55 | 0.98600 | 2.339 | |
| 140 | 2.89 | 0.11982 | 0.11982 | 61.38 | 0.98324 | 2.346 | |
| 150 | 3.71 | 0.11982 | 0.11982 | 61.20 | 0.98029 | 2.352 | |
| 160 | 4.74 | 0.11982 | 0.11982 | 61.00 | 0.97717 | 2.360 | |
| 170 | 5.99 | 0.11982 | 0.11982 | 60.80 | 0.97388 | 2.368 | |
| 180 | 7.51 | 0.11982 | 0.11982 | 60.58 | 0.97043 | 2.377 | |
| 190 | 9.54 | 0.11982 | 0.11982 | 60.36 | 0.96683 | 2.385 | |
| 200 | 11.52 | 0.11982 | 0.11982 | 60.12 | 0.96307 | 2.395 | |
| 210 | 14.13 | 0.11982 | 0.11982 | 59.88 | 0.95917 | 2.404 | |
| 220 | 17.19 | 0.11982 | 0.11982 | 59.63 | 0.9552 | 2.414 | |
| 230 | 20.77 | 0.11982 | 0.11982 | 59.37 | 0.9510 | 2.425 | |
| 240 | 24.97 | 0.11982 | 0.11982 | 59.11 | 0.9468 | 2.436 | |
| 250 | 29.82 | 0.11982 | 0.11982 | 58.83 | 0.9425 | 2.447 | |



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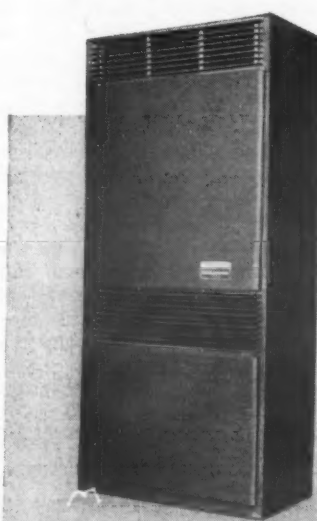
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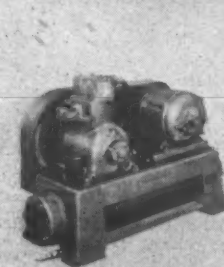
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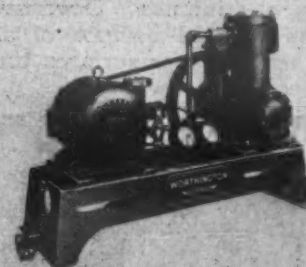
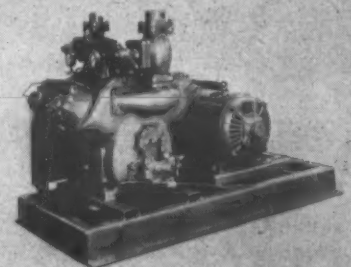
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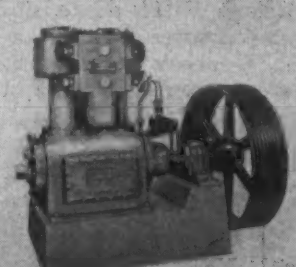
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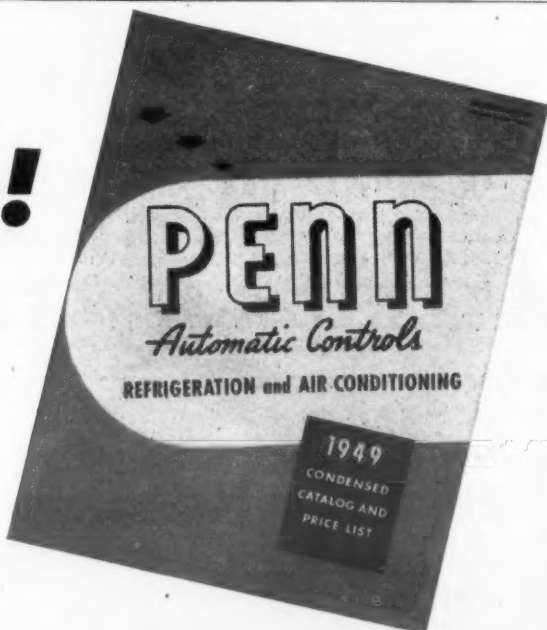


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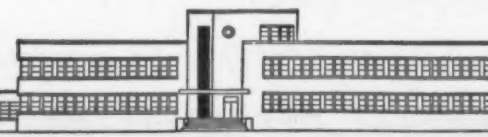
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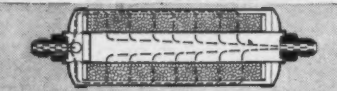
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Bill May Curb Sale, Lease of Commercial Equipment In Tenn.

NASHVILLE, Tenn.—Bills that would prohibit the sale of store, drugstore, or restaurant equipment at less than the average market price in the particular area were introduced March 31 in both branches of the Tennessee Legislature.

The proposed legislation was introduced in the State Senate by Senators J. H. Reneau of Celina and W. B. McSwain of Paris, and in the House by Representative Kenneth Bailes of Knoxville and 14 other members of the legislature.

The measure would also prohibit the giving, lending, or leasing of store, drugstore, or restaurant equipment as inducements to retailers or wholesalers to trade with certain firms.

Violation of the proposed act would be punishable by a maximum fine of \$1,000 for the first conviction, and \$5,000 for all other convictions. Each separate day the equipment was used would constitute a separate offense under the law.

Dehydrator, Fittings Catalog Issued by Refrigeration Valve

PORT HURON, Mich.—Refrigeration Valve & Mfg. Co. here has announced that its new catalog on valves, strainers, dehydrators, fittings, etc. is now ready for the trade. Copies can be obtained by writing the company on your letterhead.

Air Cooling Contractor Profits from Selling Prospect Only Installation He Can Afford

Highly Skilled Engineers Handle Contacts, Provide On-the-Spot Job Estimate



Gossett & Co. sales engineers are able to give customer first-hand information on what expense and technical changes a job will involve. This often makes an immediate sale where one might ordinarily be lost if a longer time were consumed in figuring an estimate.

NASHVILLE, Tenn.—What NOT to do in selling air conditioning equipment can be important in building a lasting business in a community, believe officials of M. T. Gossett and Co. here.

The Gossett firm is a large air conditioning and heating contractor, handling jobs from small homes to large office buildings.

The principal thing the Gossett representative is forbidden to do when he goes about a selling job, is to sell a customer an air conditioner or space cooling job that the customer's income won't justify.

The small merchant with a small annual volume mustn't be pressured into buying an expensive air conditioning system that will throw his capitalization out of kilter, Gossett teaches its men. For the small suburban or country store merchant he has an air-moving setup that will give his store a measure of comfort in the summer for his needs for \$500 or \$1,000 or more, depending, of course, on the kind of store he has.

The merchant who has an annual volume of \$100,000 or more could easily pay for a modern air conditioning outfit costing \$5,000 or so, without making his overhead capitalization too heavy.

Wide Price Range Ups Sales

By having a range of prices to meet every air conditioning and air cooling need the Gossett field of solicitation is tremendous. One rich field of almost untouched prospects is the home. While the firm's field salesmen solicit only commercial business, it makes sales in many middle class homes through radio and newspaper advertising.

For the home owner who wants to enjoy the luxurious comfort of modern air conditioning without shooting too much of his wad to get it, Gossett suggests a Carrier unit which can be installed in a single room from \$500 up and moved from room to room. Without any field soliciting or door-bell ringing the firm has installed some form of temperature control in hundreds of Nashville homes.

One example of the firm's consideration for the problems of the prospects is demonstrated by two church jobs. A \$40,000 job was installed at the First Baptist Church in the city. The membership of this particular church, however, had just finished paying off a big debt and was already sold on the idea of making this church one of the most comfortable places in town and was ready to pay for it.

Another church in the same town with about the same wealth also wanted a more comfortable sanctuary in which the heat on many summer days had been unendurable. This church, however, was raising a pile of money on another sort of campaign and didn't think it wise right then to pressure the membership on an expensive air conditioning job.

Money Scarce, Prospect Still Buys Installation

The Gossett salesman met the need by offering a Herman Nelson fan installation for a little more than \$1,000 which was readily accepted. Although it didn't produce conditions as enjoyable as the modern system at the First Baptist, it made the church far more pleasant, and gave the membership a happy solution for its cooling needs at a critical money raising time.

Some industrial buildings are so constructed that even a wealthy or high income management would balk at the cost of an air conditioning system that would be adequate for such a structure.

C. O. Holliday, industrial sales manager, says the firm ran into a problem like this with the Baird-Ward printing plant at Nashville. This is one of the largest printing establishments in the south, but when when a \$200,000 estimate was placed before the management it threw up its hands in horror.

After sizing up the situation the Gossett representative found it wouldn't be wise to pressure Baird-Ward for such a heavy outlay at the time, although no competing firm could do that kind of a job at a figure that would be satisfactory to the customer. But Baird-Ward had some floors in its building in which summer heat was almost unendurable and something had to be done. So Gossett worked out an arrangement by which Baird-Ward agreed to award contracts of \$2,000 a year for several years to service a few floors or areas at a time beginning on the worst floors first.

Gossett employs for his selling and installation jobs college-trained engineers with E.E. degrees. He starts such an engineer at \$100 a week and in addition to this he can earn an incentive commission on sales that run the incomes of some of the salesmen up to \$7,000 to \$8,000 a year.

Data Supplied Right Away

The reason he employs skilled engineers for the selling jobs is because he wants a representative who can, not only sell, but can immediately check the premises of any interested customer and give him an estimate on the kind of equipment that will best fit his needs and ultimate cost of delivering the job.

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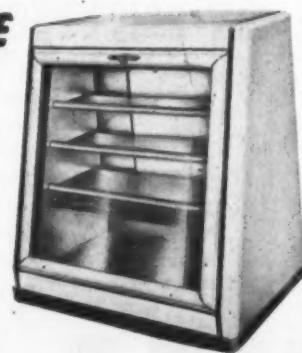
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Preview of Meetings on Copelametic Line



Branch office and field sales personnel of Melchior, Armstrong, Dessau Co., meeting at the firm's headquarters in Ridgefield, N. J., get a "preview" of the series of meetings held later for the refrigeration trade in the cities in which M-A-D branches are located. Dale Bodine (far left), Copeland Refrigeration Corp. service manager, was the principal speaker at the meetings.

F. C. Lowell, Hill Engineer, Is Dead

TRENTON, N. J.—Death of Floyd C. Lowell, refrigeration engineer at C. V. Hill & Co., Inc., due to a heart attack on March 2, was announced here recently by the company.

Lowell joined the Hill concern in 1936 as refrigeration manager. In 1937 he organized and instructed the first classes in refrigeration at the Evening Technical School, Temple university in Philadelphia.

Throughout his entire career with Hill, Lowell advanced many new refrigeration developments and conducted experimental laboratories which contributed greatly to the quality of the company's equipment, factory officials declared.

Another Ace Refrigeration

BUFFALO—Ace Refrigeration Service has been incorporated here with capital of \$20,000. Incorporators are E. A. Habitzbruther, A. A. Habitzbruther, and R. W. Chambers.

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M-A-D Meetings Spotlight New Copeland Models

RIDGEFIELD, N. J.—To bring the refrigeration trade in the areas it serves up to date on the features of Copeland Refrigeration Corp.'s line of "Copelametic" condensing units, Melchior, Armstrong, Dessau Co. recently held a series of meetings in cities throughout the east in which are located refrigeration supplies wholesaling branch offices.

Dale Bodine, Copeland service manager, was the chief speaker at the meetings, describing the new models in the Copelametic line, which has now been extended up through 7½-hp. condensing unit sizes. Construction and operating features were outlined, and possible field service operations discussed.

George H. Jaeger, vice president in charge of domestic sales for Melchior, Armstrong, Dessau, was in general charge of the program. Meetings were held at Brooklyn, Manhattan, Newark, Philadelphia, Washington, D. C., Baltimore, Boston, and Syracuse.

This schedule of meetings was preceded by a gathering of the organization's branch and field personnel at the company's headquarters.

Raleigh Firm Gets \$9,000 Hospital Refrigeration Job

RALEIGH, N. C.—Refrigeration & Sales here, has been awarded a \$9,368 contract for installation of refrigeration equipment in the new \$500,000 hospital to be erected at Louisburg, N. C.

Nebraska Legislature Kills Licensing Bill

LINCOLN, Neb.—A bill that would create an electrical administrative board and require the licensing of all electricians who first passed written and practical examinations, was killed by the public works committee of the Nebraska legislature.

The bill was opposed by refrigeration, radio, air conditioning, and heating equipment contractors and servicemen as well as factory, hotel, and other groups.

In addition to setting up a state electrical administrative board, the bill would have provided for inspections and fix standards for construction, altering or repairing any kind of electrical equipment.

Railway Station, Hotel Install Reach-Ins In Mackinaw City

CHEBOYGAN, Mich.—The possibilities for commercial refrigeration sales in resort towns was pointed up here recently by E. E. Pauly, local McCray Refrigerator Co. dealer.

Pauly reported installation of reach-in boxes in the kitchens of the New York Central and Pennsylvania railroad station and the Hotel Manitou, both at Mackinaw City.

Mackinaw City is at the northern tip of Michigan's lower peninsula.

Atlanta Dealer Opens Branch

ALBANY, Ga.—Horne Wilson, Inc., air conditioning and refrigeration dealer of Atlanta, has recently opened a new branch showroom here.

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ESCO Products have enjoyed the reputation of sturdy "Battleship" construction for more than 20 years. This built-in quality makes the ESCO Line easier to sell.

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Models from 10 to 40 cubic feet. A size for every prospect. Smart styling. . . Rugged construction. . . Tops in efficiency. . . Built-in Signal and Fast Freeze Fan—PLUS

5 Year Food Warranty
5 Year Protection Plan

Milk Cooler Lines

The amazing Model "AD" ESCO "NI-AG-RA" Line with its smooth "Icy-Wall" interior and exclusive patented Automatic "Neck-High" Water Leveler . . . the finest Milk Cooler made.

The exclusive Model "VD" ESCO "Icy-Wall" Line with its perfectly smooth "Icy-Wall" liner and controlled ice bank . . . no competition in this Line.

The standard Model "V" ESCO Line meets any competition . . . noted for its durable "Battleship" construction.

ESCO DeLuxe Beverage Coolers

ESCO Beverage Coolers provide dry storage with efficient controlled forced air cooling. Real business-builders for clubs, cafes, restaurants . . . convenient slide-away lids, bar-height top.

ESCO Ice Makers

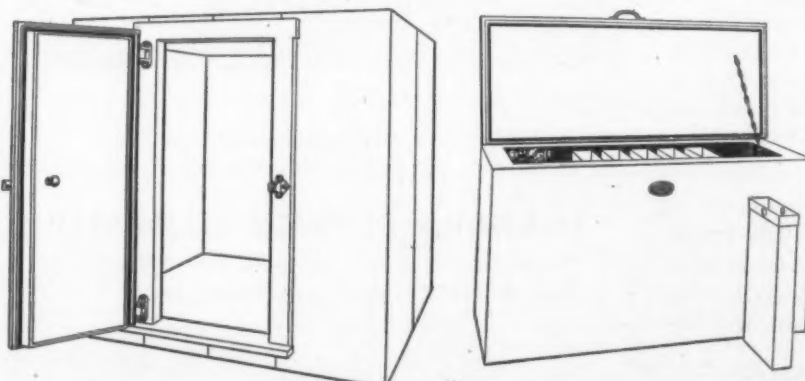
The ESCO Ice Maker Line (75 to 2000 lbs. daily) provides capacities to meet the needs of hotels, hospitals, country clubs, and restaurants of all sizes.

ESCO Sectional Cold Rooms

Three standard Models (or to order for special sizes) provide the answer for the growing demand for easy-to-install, walk-in, cold storage facilities. Standard panel sections permit later expansion and provide flexibility.

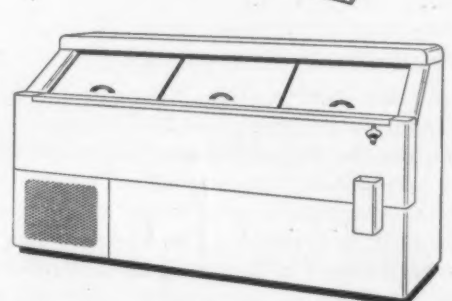
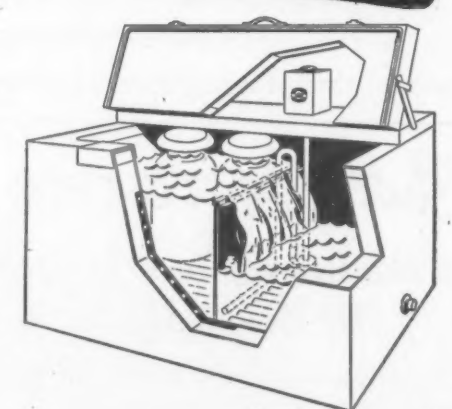
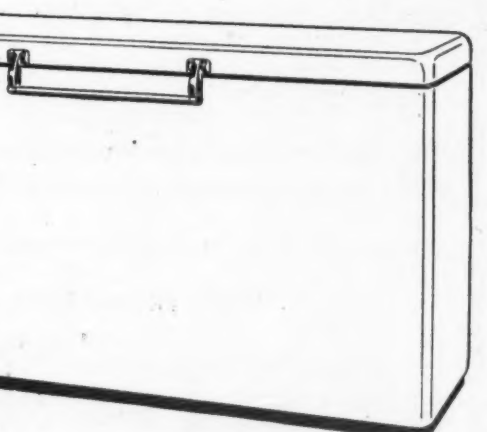
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The SERRICK Corporation, Kilgore Ave., Muncie, Indiana

Selling Room Conditioners Offers No Problems, But Some Fundamental Steps Must Be Taken

Laube Points Out Mistakes To Be Avoided and Suggests Some Steps for Dealers Who Enter Field

By Herbert L. Laube, President,
Remington Air Conditioning Div. of Remington Corp.

"There's no doubt of it now. The ROOM AIR CONDITIONER is coming into its own, as a major appliance." So writes an experienced friend, and so it seems to one who has been in this field from its very start.

The depression decade, 1930-1940, was the decade of the household electric refrigerator because, principally, the men who sold it did it right. Less than nine months away is the beginning of another decade, 1950-1960; and in our industry it can and will be the decade of the single room air conditioner, barring war and provided only that we do it right, again, throughout an unbroken chain from factory, to distributor, to dealer, to user.

It is time to get set, all along the line, for the decade of *personalized* air conditioning. Many are already making good profits out of room air conditioners at the retail level. But there is no reason why *anyone* capable of doing a competent job of retailing major appliances cannot also make money in air conditioning. Those that *will* are those that *learn* about this business before they go too fast, and who study, adopt and adapt the experiences of those who

are making a selling success of room air conditioners today.

So let's learn what we can from the past, let's see where we stand now, and then let's look into the future. A good way to start is to ask the questions which any sound businessman would want answered, before he lays his money on the line.

1. What Progress Have We Made to Date?

Air-cooled room air conditioners were first marketed in any quantity in 1935. The market then, as now, was believed to be tremendous. Within a short time room air conditioners were being offered by American Radiator, Carrier, Chrysler, Frigidaire, General Electric, Kelvinator, Philco, Remington, Westinghouse, York, and others. Plenty of sales talent to put it over, one would say.

Then why the appalling fact that the best available sales figures indicate total world-wide industry sales of only 30,000 units during 1941, the best pre-war year? Perhaps some of what follows will give the answer.

Before considering the *post-war* record of room air conditioners, let's ask ourselves the very basic question

of whether there is a really sound foundation for this business.

2. Does It Rest on a Firm Foundation?

Three facts, taken together, should convince even the most skeptical that the answer to this question is "yes." Here they are:

a. Millions of people everywhere who do not yet have the benefits of air conditioning, either in their homes or places of work, have been pre-sold on its advantages in theaters, stores, restaurants, trains, etc.,

b. No other system of air conditioning of equal cooling power costs less than the single room air conditioner, and,

c. Thousands upon thousands of the pre-sold people who do not have air conditioning do have the money with which to buy room air conditioners now.

The post-war record of the room air conditioner business, though nothing to brag about, is certainly better than what went before. Pearl Harbor brought room air conditioner production to a stop. Not until 1946 were any more made—just a handful. Production could be and was stepped up in 1947. During 1947 some 60,000 units were made and sold.

3. Why Has Progress Been So Slow?

Before the war, when room air conditioners were called "room coolers," and sold only as such, the selling season was much shorter than now.

It was impossible to properly train enough good salesmen to take full advantage of this short selling season. Result? The effort to make money fast over this short season led to certain bad practices which retarded rather than advanced the public acceptance of what we have to sell.

Rather than lay down this issue of the NEWS to barge quickly into the retailing of air conditioners you, Mr. Dealer, may make more money faster if you will observe and heed those particular mistakes of the past which are still prevalent today. Here are three of the worst:

1. Overloading the Electric Circuit:

Plugging the unit into an already over-loaded 110-volt light circuit. Result: Blinking lights, blown fuses and an irate owner. Special electric circuits are always provided for electric ranges; should be provided for all room units over ½ hp., and for many ½-hp. units as well.

2. Side-stepping the Noise Problem:

Many a housewife who scarcely notices the operation of her electric refrigerator would complain bitterly about its apparent noise, during the quiet of the night, were it parked next to her bed. Yet the powerful mechanism of an air conditioner

develops more noise than does an electric refrigerator.

What's the answer? Take no order for bedroom use without letting the prospect (and his wife) listen to the unit in a quiet room; ask them whether they can become accustomed to its gentle hum, in return for the many benefits it provides; contrast it with the greater noise level of the average desk fan; and first thing you know your customer will sell himself and you'll have no come-back due to noise.

3. Not Selling Enough Cooling Power:

Comfort, as we all know, is the absence of discomfort. If your customer needs a one horse machine and you sell him a half, he still has discomfort on the days when he wants comfort most. Much of today's buyer resistance results from the fact that so many units sold in the past were too small for the rooms they were expected to cool.

In short, too many of us have feared we'd lose the sale, if we told the prospect the limitations of our units; or quoted the price at which an adequate unit could be properly installed. Successful retailers of room units say "t'ain't so!"

4. What's Peculiar About This Business?

There are two peculiarities of this business every retailer should keep in mind: The matter of *capacity*, and the *personal nature* of the room air conditioner.

The capacity of a domestic refrigerator is obvious to the buyer. Once he has it full, that's it! If he buys a Ford, it will hold as many people as a Cadillac; it's not a matter of *capacity*. And a \$19.95 table radio gets the local news program just about as well as a \$995.00 model.

But in a room air conditioner we sell capacity in the form of cooling power. Unless *enough* is sold the buyer has too little. Only at the dealer level can the decision be made to sell enough or, failing that, not to sell too little!

While "store coolers" are sold primarily to make the cash register ring more frequently and louder, the room air conditioner is sold (except for hotels, etc.) to provide the buyer *personally* with greater comfort, health, and personal efficiency. The personal nature of the room air conditioner is recognized by those who are successful in selling it.

5. What's the Market Today?

The industry's best heads agree that the total number of potential buyers—those with the desire and the money—is stupendous. But no one seems to have "the figures."

The market falls conveniently into four groups: (1) Offices of professional men, executives, and others; (2) Residential applications for bedrooms, living rooms, etc.; (3) Guest rooms in hotels and motels; and (4) Miscellaneous uses as in hospitals, laboratories, dark rooms, small radio stations, etc.

Numerically the answer is less clear. Some 579,000 U. S. residences are now estimated to be worth over \$20,000 each. Their occupants all can afford room air conditioners; so can most of the people who live in the many more homes worth \$10,000 to \$20,000.

For 1945 the Census Bureau reports 569,972 individuals with an "adjusted gross income" over \$12,000. They can all afford room air conditioners; so can many more, who earn \$5,000 to \$12,000 per year.

This we do know: For 1949 the industry goal is 100,000 units to retail for about \$50,000,000. By Jan. 1, 1950, some 300,000 room units will have been sold; perhaps 100,000 before the war, and 200,000 since. Yet the surface has not been scratched; the market is still "stupendous."

Because of the very personal nature of the room air conditioner, its sale can always be advanced by stressing the theme "Better Health through Better Air." There are many interesting relationships of a personal nature that are powerful sales tools in the hands of a competent man. For example:

a. In the average large city the average man's diet of germ laden dust amounts to 24 ounces a year.

b. Man's daily diet of food and water averages 7 pounds; as against 34 pounds of air.

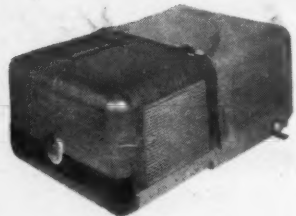
c. Man's stomach normally takes food three times a day; his lungs take air 15 times a minute or 21,600 times a day.

d. The incidence of illnesses of the air passages (respiratory illnesses) exceeds the incidence of all other forms of illness, combined.

No wonder Dr. Thomas Parran, former U. S. Surgeon General, was quoted in the Feb. 16 *Pittsburgh Press* as having said: "We have hardly begun the struggle to clean

(Concluded on next page)

AROUND THE WORLD IN THREE YEARS!



Yes, that's the truly remarkable acceptance record for
PACIFIC AIR CONDITIONERS

IN 29 COUNTRIES, AND OF COURSE IN 48 STATES, THOUSANDS OF **PACIFIC** HIGH CAPACITY WINDOW TYPE AIR CONDITIONERS HAVE BEEN INSTALLED AND ACCLAIMED BY USERS FOR THEIR SUPERIOR PERFORMANCE IN ONLY THREE YEARS.

This world-wide acceptance and proven performance is of vast value to you because it insures a fast-selling, profitable line.

ASK US FOR FULL DETAILS ON THESE UNUSUAL PACIFIC UNITS

SOME FRANCHISES STILL OPEN

WRITE TODAY



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In Canada: Air Conditioning Engineering Co., Ltd., Montreal

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• Power savings and water savings combine to make money for you when you replace an old fashioned refrigerant condensing method with a modern Niagara AEROPASS Condenser.

In this new method the refrigerant gas passes through two cooling coils. The first coil, air-cooled, removes the superheat and condenses oil vapor from the refrigerant; the second condenses the refrigerant by the evaporation of a water spray from its surface. The heat is transferred to the air; less than 10% of the water used in conventional condensers is consumed and you save the cost of the water and the cost of its piping, pumping and disposal.

In addition the Niagara Aeropass Condenser controls the head pressure of your compressors at the lowest point for good operation, reducing your power bills. It does this automatically the year 'round, giving full capacity for peak summer loads and providing the greatest power saving in cold weather.



Write for Niagara Bulletin No. 103 for further information

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INDUSTRIAL COOLING
HEATING • DRYING

NIAGARA

HUMIDIFYING • AIR
ENGINEERING EQUIP.

Selling Room Air Conditioners--

(Concluded from preceding page)
up the air we breathe," at the same time he urged air "as pure as the milk we drink".

6. How Should I Sell Them?

It is quite impossible, in the space available, to give even a condensed answer to the question: "How should room air conditioners be retailed," and no two men would answer that question exactly the same. The best that can be done here is to suggest sources of helpful information and record a few worthwhile items—most of which come from men who have demonstrated their ability to retail room units on a sound *continuing* basis—and at a profit.

John H. Patterson's five-step specialty selling formula has never been beat. The most palatable way to learn all about it is to read George F. Taubeneck's "One Foot in the Door." A condensed version appears in George M. Hanning's interview with Frigidaire's R. F. Callaway, in the Feb. 21 issue of the NEWS.

Observe, if you can make the opportunity, the operation of some specialist who is already successful in this field. One such firm, which has a highly successful separate room air conditioner department is Air Comfort Corp., of Chicago. Its president, H. E. Wheeler, gave an outline of his operation in the NEWS last Dec. 13. Here are a few of the high-spots:

(1) There must be a separate department for this operation even if it only consists of one man;

(2) This department must be self-supporting the year-round, being supplemented in the winter by other items which sell to the same customers;

(3) Sell the customer on the other features of a room air conditioner so thoroughly that he'd buy the machine if it did not have cooling; and,

(4) Actually estimate the cooling load on every job and have the courage to say no, to the prospect who wants "just a little cooling."

It's generally agreed that satisfied users are the very best source of room air conditioner leads. That's why it's vital to do the job right, the first time, or not to do it at all. Cold canvassing—door bell pushing—and by phone, too—is the next best source of leads. Thereafter come direct-by-mail, newspaper space, radio, and store traffic.

7. Is the Price Too High?

Some competent dealers sincerely believe the price of room air conditioners to be too high. It is not diffi-

cult to demonstrate, first, that current prices are not high and, second, that these prices can readily be justified to the prospective purchaser.

Take for example the 10 companies listed as having entered this field in its early days. Half of them are now out of the business. Isn't this the best proof that they tried to lower retail prices too soon; did it so soon in fact, as to make the business too unprofitable to be continued.

The most successful room air conditioner dealers have found that the best way to overcome price resistance is to evaluate and sell *all six* functions of the room unit, not just cooling. Once a salesman has been trained to present, properly, the six functions charted below he can make the price of the unit seem surprisingly low.

Our industry is increasing its effort to educate the prospect on the benefits provided by air conditioning during all four seasons of the year. This trend is to be applauded. It is based on the obvious fact that an air conditioner which benefits the user 12 months out of the year is a better investment than one he expects to use during three summer months only.

As time goes on we predict that the discriminating personal buyer will demand all-year air conditioning, and that he will want it in the form of a room air conditioner, under full automatic control—automatic control of both heating and cooling.

But to revert to the matter of "high price," facts and figures, too, will help to relieve this feeling. Ten years ago an 8,000 B.t.u. conditioner retailed for \$360, or \$45 per 7,000 B.t.u. Today, a better machine of 8,000 B.t.u./hr. retails for \$440, or \$55 per 1,000 B.t.u. Thus, while the price of cars increased 125%, room air conditioners advanced only 22%. Today a room air conditioner with 25 times the cooling power of the average household refrigerator costs only twice as much.

8. Is This a Good Business For Me?

Unlike the contracting type of air conditioning business, there are many favorable factors inherent in the marketing of room air conditioners: It eliminates the cost of a specialized engineering department; takes the customer and the salesmen out of the realm of complex technical discussion; makes it possible to give quotations without wasting time; permits the display, demonstration, and immediate delivery of the equipment; reduces inventories and speeds their

The 6 Functions of Room Air Conditioners

Room Air Conditioners,
and when you need them.

Winter Spring Summer Autumn

| Room Air Conditioners, and when you need them. | Winter | Spring | Summer | Autumn |
|-------------------------------------------------------------------------------------------------------------------------------------|--------|--------|--------|--------|
| 1. VENTILATION—Bringing in without drafts an adequate, but controlled, supply of fresh outdoor air | X | X | X | X |
| 2. AIR CLEANING—Filtering dangerous and unsanitary dust, soot, and pollens out of the air admitted | X | X | X | X |
| 3. AIR CIRCULATION—Replacing stagnant room air with air in proper motion—stimulating and refreshing | X | X | X | X |
| 4. NOISE ELIMINATION—Hushing outdoor noises to maintain indoor quiet | X | X | X | X |
| 5. COOLING—Cooling room and ventilating air to provide healthful, reviving relief from heat in later spring, summer, and early fall | | X | X | X |
| 6. DEHUMIDIFICATION—Removing excess moisture from oppressively damp, warm air in muggy seasons | | X | X | X |

turnover; diminishes the capital investment needed for a given sales volume; makes it possible to predict the profit at the time of sale; and, since only a fraction of the price is used for labor, makes it safe to sell the unit on the instalment plan.

The appliance dealer will recognize and appreciate still another group of advantages to the marketing of room air conditioners: Unlike television sales, which merely replace radio volume, it does not replace anything; unlike the electric refrigerator, the customer who buys one is still a prospect for more; unlike many other lines, "trade-ins" are not yet a problem; the number of different models needed to make a complete line is so low that it eliminates the need for carrying a wide variety of costly inventory; and, finally, in the words of R. F. Callaway, "you can't stop the growth of air conditioning

Selling a Dealer the Room Conditioner Story



Herbert L. Laube (second from right), behind a lineup of Remington window and console model room air conditioners, discusses possibilities of such units with a visitor at a recent trade show. In the accompanying article he outlines some steps to be taken and things to be avoided in merchandising room air conditioners.

now, anymore than you can stop people from buying electric refrigerators and automobiles."

So it's pretty much up to you, Mr. Dealer. You can be an opportunist and use an overdose of hot air to sell an underdose of cooling. But you'll never get far that way, and would do the industry a favor, if you didn't even start. You can be an "accidental" listing yourself under Air Conditioning in the back of the phone book, and wait for the phone to ring, when it gets hot. As such, you'll do little good, and little harm, either.

Or you can be a specialist, and make a business of rendering a *personalized air conditioning service*,

based on a thorough understanding of what it takes to create a sound business, that will grow and prosper.

Should you choose this latter course, avoiding the mistakes of the past, and becoming worthy of the opportunity that is before us, you will surely prosper. But you will do more than that. You will build *prestige* for yourself, and your firm because of your tangible contribution to better health and better living. And, at the same time, you can't help but strengthen the *permanence* of your business, because the market for room air conditioners has not even been scratched and, as a business, it is just beginning to enter its most rapid rate of growth.



The market's there
... get **YOUR** share!

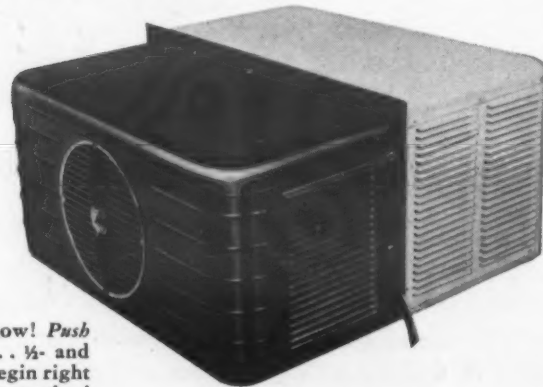
Write NOW for VIKIMATIC Franchise Plan!

Here's opportunity! Cash in ... *right now* ... on unprecedented demand for summer air conditioning. Homes, stores, offices want it. The market's there ... get *your* share!

Sell these VIKIMATIC Profitmakers! Put an aggressive sales force to work ... for *extra* summer profits!

VIKIMATIC—long-established in home heating and air conditioning—has expanded into the *summer* air conditioning field. We offer now a *complete* line of modern, quality, mass-produced, competitively-priced cooling equipment. And we maintain national advertising, alert sales promotion, and sound merchandising ... *to help you sell!*

So act now ... for your *extra* summer profits! Franchises are available in many parts of the country. Write, wire or phone ... *today* ... for VIKIMATIC'S Summer Air Conditioning Franchise Plan! The market's there ... get *your* share!



PACKAGED COOLING—here's proved customer-appeal for stores, shops, offices. Sell VIKIMATIC units ... 3- to 15-ton capacities ... for every need. They're your BIG profitmakers!

ROOM COOLERS—big demand, right now! Push these efficient VIKIMATIC coolers ... 1/4- and 3/4-hp. capacities ... in homes, offices. Begin right now ... for *your* share of the waiting market!

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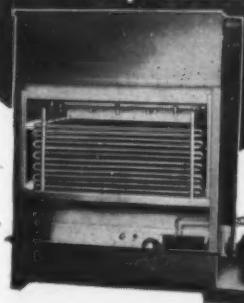
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Simplifying the Selection of Air Conditioning Coils

This is Part 1 of a two-part article. Part 2 will be published in the next issue.

Part 1 discusses the factors and variables in estimating the cooling load, while Part 2 will deal with coil selection methods.

By D. D. Wile, Chief Engineer, Refrigeration Engineering, Inc., Los Angeles

The selection of air conditioning coils depends to a large extent upon the nature of the air conditioning load. It is important to understand that an air conditioning coil removes moisture as well as heat and that the ratio of moisture removal to heat removal may be considerably different on different types of jobs.

Nature of the Air Conditioning Load

The principal elements of the air conditioning load are:

1. Body heat from occupants.
2. Ventilation and infiltration.
3. Heat transmission through walls, windows, ceiling, and floor.
4. Heat from lights, motors, and appliances.

The occupants of the air conditioned space give off sensible heat because their bodies are above room temperature and they give off latent heat with the evaporation of moisture from their bodies. As illustrated in Fig. 1, the amount of heat given off by people depends considerably upon their state of activity.

It will be noted that a very active person may give off twice as much sensible heat and five times as much latent heat as a person at rest.

One very important function of an air conditioning system, in addition to removing heat, is to control smoke and odors. While various methods are in use, most air conditioning systems use outside air for this purpose. The amount of outside air required depends to a large extent upon the amount of smoking. Fig. 2 illustrates the wide variations in outside air requirements between people who are not smoking, smoking lightly, and smoking heavily.

The heat load due to bringing in warm, moist, outside air varies considerably with different locations. This is clearly shown in Fig. 3. It is quite obvious that any rules of thumb regarding outside air load that apply to one locality might be completely out of order in another locality.

Table 1 provides a convenient method for determining the latent and sensible heat load due to ventilation air. In order to use Table 1, it is of course necessary to know the outside design conditions. Table 2

Fig. 1—Heat Load from People In Various States of Activity

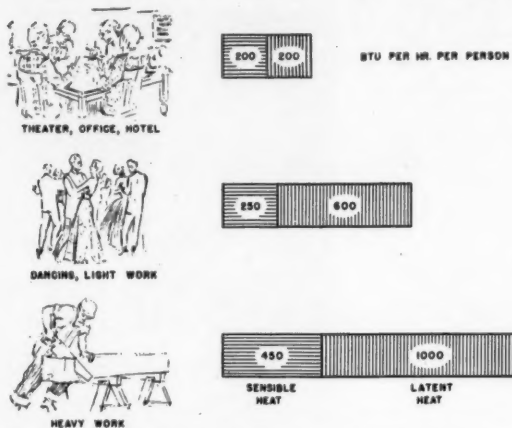


Fig. 2—Outside Air Requirements In Terms of the 'Smoking Load'

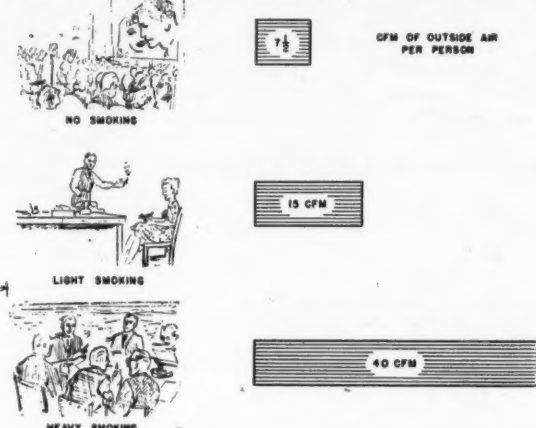
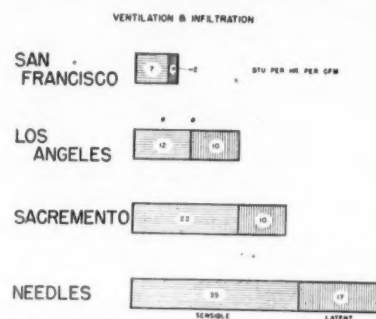


Fig. 3—Latent & Sensible Heat Load Per C.F.M. of Outside Air



shows a sample of a table that gives the outside design conditions for many cities in the United States.

In restaurants and certain other establishments electrical and gas appliances often contribute to the air conditioning load. Table 3 lists the heat load from a number of commonly used appliances.

It is common practice to use an estimating form to tabulate the various items that compose the heat load. Table 4 is an example of a simplified form that will be found useful for this purpose. It is only necessary to fill in the various items in order to obtain the total sensible and latent heat load.

It will be interesting to compare two types of air conditioning applications. Fig. 4 shows the comparison of the air conditioning load for a restaurant and a store in identical buildings. The first four items referring to walls, windows, floors, and ceilings, are the same. The restaurant

Table 1—Ventilation Load

| VENTILATION & INFILTRATION (BTU PER HOUR PER CFM) | | | | | | | | | |
|------------------------------------------------------|------------------|---------------|-------------|------------|--------------------|------------------|---------------|-------------|------------|
| WIDE-78° DB 45% RH | | | | | WIDE-80° DB 50% RH | | | | |
| OUTSIDE DRY BULB | OUTSIDE WET BULB | SENSIBLE HEAT | LATENT HEAT | MULTIPLIER | OUTSIDE DRY BULB | OUTSIDE WET BULB | SENSIBLE HEAT | LATENT HEAT | MULTIPLIER |
| 65 | 70 | 75 | 75 | 1.0 | 75 | 78 | 80 | 80 | 1.0 |
| 65 | -2 | 15 | 34 | 7 | 95 | 15 | 28 | 37 | 15 |
| 90 | -7 | 10 | 29 | 12 | 100 | 10 | 23 | 32 | 20 |
| 95 | -12 | 5 | 24 | 17 | 105 | 5 | 18 | 27 | 25 |
| 100 | 0 | 19 | 22 | 110 | 0 | 13 | 22 | 30 | |
| 105 | -5 | 14 | 27 | 115 | -5 | 8 | 17 | 35 | |

Table 2—Suggested Design Dry-Bulb and Wet-Bulb Temperatures And Wind Velocities for Period June Through September*

| Col. A | Col. B | Col. C | Col. D | Col. E | Col. F |
|--------|---------------|----------------------------------|--------------------|--------------------|----------------------------|
| State | City | Elevation At Weather Station Ft. | Design Dry-Bulb F. | Design Wet-Bulb F. | Avg. Wind Velocity m.p.h.† |
| Ala. | Birmingham | 694 | 95 | 78 | 5.2 |
| | Mobile | 10 | 92 | 79 | 8.6 |
| | Montgomery | 201 | 95 | 78 | ... |
| Ariz. | Flagstaff | 6902 | 100 | 70 | ... |
| | Phoenix | 1112 | 108 | 75 | 6.0 |
| | Yuma | 138 | 105 | 75 | ... |
| Ark. | Bentonville | 1295 | 100 | 78 | ... |
| | Fort Smith | 449 | 100 | 78 | 12.0 |
| | Little Rock | 257 | 96 | 79 | 6.0 |
| Calif. | Fresno | 277 | 104 | 70 | 7.9 |
| | Los Angeles | 312 | 90 | 70 | 6.0 |
| | Needles | 480 | 102 | 70 | ... |
| | Red Bluff | 305 | 100 | 68 | ... |
| | Sacramento | 25 | 105 | 74 | 5.0 |
| | San Francisco | 52 | 90 | 65 | 11.0 |

(This is a sample only of an outside design condition table for summer air conditioning. This sample is from an instalment of James J. LaSalvia's "The Key to Air Conditioning" series appearing in the News. Such tables are available in the ASHVE Guide, and from Air Conditioning & Refrigeration Machinery Association.)

Table No. 3—Heat Gain from Appliances

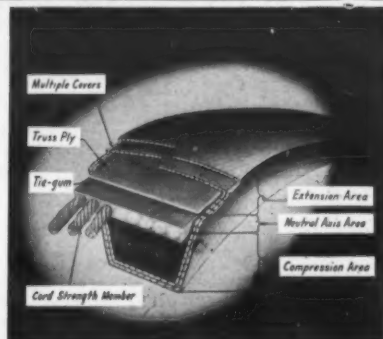
| Appliance | B.t.u. per Hour* | | Gas | |
|-------------------------------------------|------------------|--------|----------|--------|
| | Sensible | Latent | Sensible | Latent |
| Coffee Brewer, ½ Gallon | 900 | 200 | 1,350 | 350 |
| Coffee Brewer Unit, 4½ Gallon | 4,800 | 1,200 | 7,200 | 1,800 |
| Coffee Urn, 3 Gallon | 2,400 | 1,600 | 2,700 | 2,700 |
| Coffee Urn, 5 Gallon | 3,400 | 2,300 | 3,900 | 3,900 |
| Food Warmer, per sq. ft. of top surface | 350 | 350 | 850 | 450 |
| Fry Kettle, per sq. ft. of fry area | 3,500 | 5,000 | 6,000 | 4,000 |
| Griddle, per sq. ft. of fry area | 1,800 | 1,000 | ... | ... |
| Grille, meat, per sq. ft. of fry area | 4,700 | 2,500 | 10,000 | 2,500 |
| Grille, sandwich, per sq. ft. of fry area | 2,700 | 700 | ... | ... |
| Stoves, short order, per sq. ft. of top | ... | ... | 3,600 | 3,600 |
| Toaster, belt driven, 2 slices wide | 5,100 | 1,300 | 7,700 | 3,300 |
| Toaster, belt driven, 4 slices wide | 6,100 | 2,600 | 12,000 | 5,000 |
| Waffle Iron, 20 waffles per hour | 1,100 | 750 | ... | ... |
| Hair Dryer, Blower | 2,300 | 400 | ... | ... |
| Hair Dryer, Helmet | 1,700 | 330 | ... | ... |
| Permanent Wave Machine | 850 | 150 | ... | ... |
| Sterilizer for Physicians Instruments | 650 | 1,200 | ... | ... |

*Note: When hooded, use half of the above values.

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End Efficiency Loss—Reduce Belt Slippage and Aging—Insure Longer Peak Performance on Air Conditioning Blowers and Refrigerating Compressors.

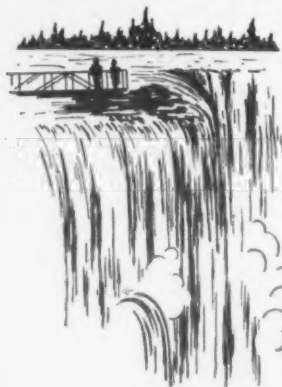
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— Conserves up to 95% of normal water demand

Because of their efficient design, Marlo Cooling Towers utilize water as the precious, costly commodity that it is... And, in large or modest installations, the other Marlo quality features are important too. Sump tank, frame, eliminators, wheels and scrolls are hot-dip galvanized; scroll and panels are mastic-coated for double protection... Bronze inspection-panel hardware for unfailing accessibility. Marlo evaporative condensers are available in 3 to 100-ton capacities that provide combinations for infinite requirements.

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Table 4—Estimating Form for Determining Cooling Load

| COOLING LOAD ESTIMATING FORM | | | | | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------|--------------------------|--------------------------|-------------|
| ITEM | QUANTITY | MULTIPLIER | | SENSIBLE LOAD | LATENT LOAD |
| 1. WINDOWS exposed to Sun (Use only exposure with largest load) East, Southeast Southwest West Northwest | Sq. Ft. | Inside Shades | Outside Awnings | | |
| | | 45 65 100 35 | 25 40 60 25 | | |
| 2. WINDOWS facing North or in the shade | Sq. Ft. | 90 12 | 100 22 | 110 32 | |
| 3. WALLS Masonry or Frame Insulated Glass Brick (no sun) Interior partition single thickness Interior partition double thickness | Sq. Ft. | 4 2 5 7 4 | 6 4 10 12 7 | 8 5 15 17 10 | |
| 4. ROOF No ceiling With ceiling Ceiling under attic Under occupied floor Insulated | Sq. Ft. | 16 14 12 4 4 | 20 17 15 6 6 | 24 21 18 8 8 | |
| 5. FLOORS | Sq. Ft. | 3 | 5 | 7 | |
| 6. LIGHTS | Watts | | 3.4 | | |
| 7. MOTORS | H.P. | | | | |
| 8. APPLIANCES (See Table No. 3) | No. Units | | | | |
| 9. PEOPLE Theatre, Office, Hotel Restaurant, Drug Store Dancing, Light Factory work Heavy work | Number | | | | |
| | | | | | |
| 10. INFILTRATION (One Outside) Room Volume = cfm Wall = 80 (Two Outside) Room Volume = cfm Walls = 40 (Three or more Outside) Room Volume = cfm Outside Walls = 30 Swinging door, 100 cfm per passage Revolving door, 60 cfm per passage | cfm | | | | |
| 11. VENTILATION (Use only the excess over item 10) Smoking No. People None x 7 1/2 = cfm Light x 15 = cfm Heavy x 40 = cfm | cfm | | | | |
| Total Sensible & Latent | | | | | |

Table No. 5—Relative Humidity Table

| Per Cent Relative Humidity | 70 | 72 | 74 | 76 | 78 | 80 | 82 | 84 | 86 | 88 | 90 | 92 | 94 | 96 | 98 | 100 |
|----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 40 | 55.8 | 57.4 | 59.0 | 60.5 | 62.0 | 63.5 | 65.1 | 66.7 | 68.2 | 69.7 | 71.2 | 72.8 | 74.4 | 76.0 | 77.6 | 79.2 |
| 45 | 57.2 | 58.8 | 60.4 | 62.0 | 63.6 | 65.2 | 66.8 | 68.4 | 69.9 | 71.5 | 73.1 | 74.7 | 76.3 | 77.9 | 79.5 | 81.1 |
| 50 | 58.5 | 60.2 | 61.8 | 63.4 | 65.1 | 66.8 | 68.4 | 70.0 | 71.6 | 73.2 | 74.9 | 76.6 | 78.3 | 80.0 | 81.7 | 83.4 |
| 55 | 59.8 | 61.5 | 63.1 | 64.8 | 66.6 | 68.3 | 69.9 | 71.5 | 73.2 | 74.9 | 76.7 | 78.4 | 80.1 | 81.8 | 83.5 | 85.3 |
| 60 | 61.0 | 62.7 | 64.4 | 66.2 | 68.0 | 69.7 | 71.3 | 73.0 | 74.8 | 76.6 | 78.4 | 80.1 | 81.9 | 83.6 | 85.3 | 87.1 |

Fig. 6-a—Wet-Bulb Chart

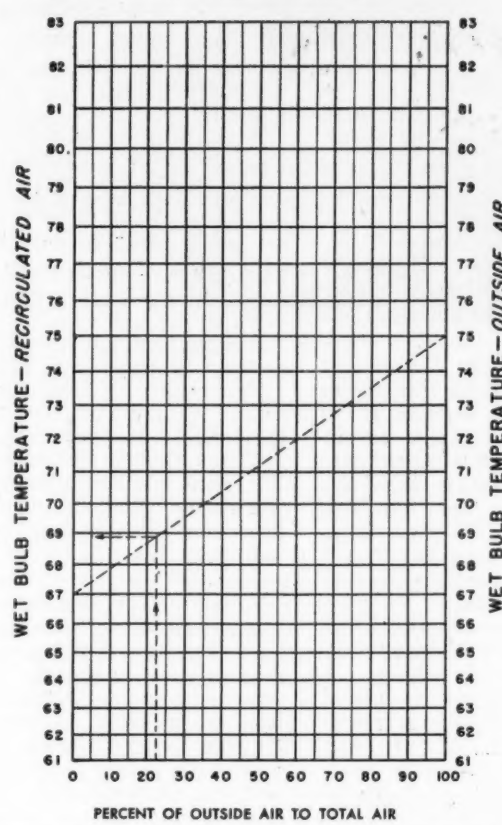
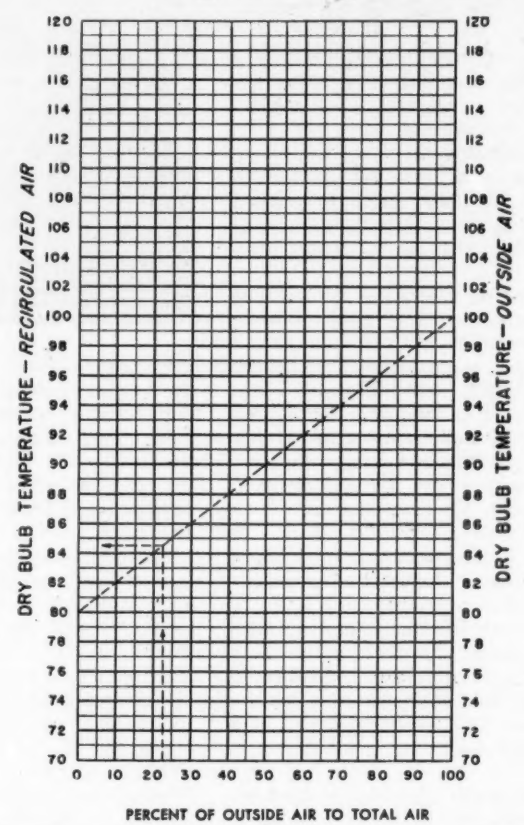


Fig. 6-b—Dry-Bulb Chart



Estimating the Load--

(Continued from preceding page)

estimating form as shown in Table 4, the sensible heat ratio is obtained by dividing the sensible heat by the total of the sensible and latent heats. Thus, in Fig. 4, the sensible heat ratio for the store is 85% and for the restaurant with its large latent load is 65%.

Air entering the cooling coil is usually a mixture of recirculated and outside air. The wet and dry-bulb temperature of this mixture can be determined conveniently from the charts in Fig. 6.

Using Fig. 6a, draw a straight line between the wet-bulb temperature of the recirculated air on the left-hand scale and the wet-bulb temperature of the outside air on the right-hand scale. Read the wet-bulb temperature of the mixture where this line crosses the per cent of the outside air.

The dry-bulb temperature of the mixture may be determined in a similar manner from Fig. 6b.

When design conditions are expressed in terms of dry-bulb temperatures and relative humidity, Table 5 may be used to determine the corresponding wet-bulb temperature.

(Part 2 of this article, covering simplified methods used in the selection of air conditioning coils, will be published in the next issue.)

Fig. 4—Comparative Load

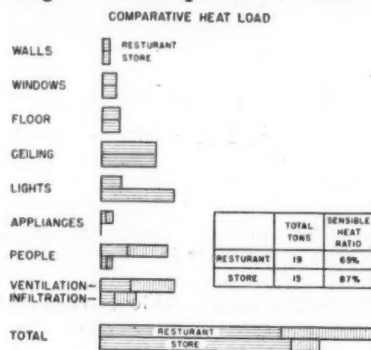


Fig. 4—Comparative Heat Load for a restaurant and a store.

Fig. 5—Coil Selection

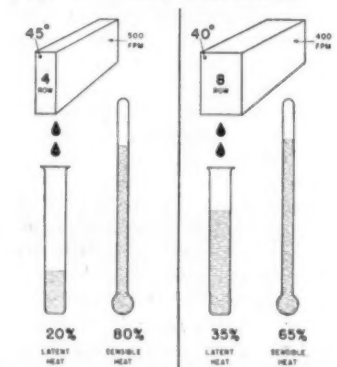


Fig. 5—Coil selection for sensible and latent heat performance.

Sell Air Conditioning by Gemco

MAKERS OF PRECISION-BUILT EQUIPMENT FOR 31 YEARS

Since 1918, Gemco has been building precision machinery... and has translated its wealth of precision-manufacturing know-how into the building of a better packaged-type Air Conditioner.

The birth-pains are long past. Gemco is established in the field as an economical, efficient cooler to buy and operate... and as a profitable one to sell. Gemco's long experience in designing and making fine machinery is paying

good dividends to dealers and customers.

A few excellent territories are still open. Wire or write for information on the valuable Gemco Franchise.

Remember, too—Gemco Distributors and Dealers automatically become outlets for MIRACULA, the Heat Pump that has captured the headlines at all the Air-Conditioning and Heating and Ventilating expositions for the last 2 years.

ONLY GEMCO GIVES YOUR CUSTOMERS THESE FEATURES:

LESS WEIGHT...

Easy installation. Strong aluminum alloy 2-stage compressor helps save 450 pounds.

LESS WATER...

Saves up to 50%. Gemco can be installed where water is warm, scarce, or expensive.

LESS NOISE...

No knocking or pounding. Gemco compresses refrigerant not once, but twice, in two easy stages.

LESS UPKEEP...

Motor cooled with refrigerant lasts longer.

MORE PROFIT...

No hot weather slumps. Gemco gives work-and-sales-stimulating climate when it's sweltering out-of-doors.

NO VIBRATION!...

Try this 5c Test: Balance a nickel on edge on a Gemco compressor. Start and stop the motor. The coin stands... no vibration to run up service costs and wear out machinery.



Gemco

AIR-CONDITIONING

GENERAL ENGINEERING & MANUFACTURING CO.

4417 Oleatha Ave. • St. Louis 16, Mo.

Precision Manufacturers for 31 Years

NOW GET THE INSIDE STORY

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☐ Gemco Air Conditioner folder☐ Miracula Heat Pump folder

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Address _____

City _____ State _____



LENCO

ROOM AIR CONDITIONER

- Furniture Styled
- Highest B.T.U. Output
- Low Operating Cost
- Engineered Quality
- Moderately Priced

These features are the kind that prospects understand and immediately want in a Room Air Conditioner. They mean easier and quicker sales for you.

Inquiries invited from Dealers and Distributors.

LENCO DIVISION

LOUIS ENGINEERING CO.

214 W. ONTARIO ST., CHICAGO 10, ILL.

Inspecting Installation Site Before Making Sale Will Promote Satisfaction by Insuring Sale of Proper Size Room Cooler

By Bernard A. Mitchell, President,
Mitchell Mfg. Co., Chicago

Room air conditioners, or "room coolers" as they are sometimes called, were first introduced to the public a few years before World War II. During the war, all production ceased.

Today, room air conditioners are again on the market, and sales are soaring. The number of units sold in 1948 was double that of 1947. In 1949, the industry is producing more than twice the number of units turned out in 1948. Like television, room air conditioning is rapidly coming into its own as a grand new industry.

While almost everyone is familiar with air conditioning in public places, a recent survey reveals that less than 5.1% of the population are aware that a compact, self-contained room air conditioner is available for installation in home bedrooms or in private offices to provide the same comfort people enjoy in an air conditioned theater, store, or restaurant.

This startling public lack of awareness of the existence of room air conditioners dramatically points up the need for widespread activity and promotion by the industry. The relatively small number of dealers now handling room air conditioners know that as fast as the public learns about the product, there is a sudden corresponding increase in sales.

And why not? The fact is that all people expect and demand heating in



RIGHT: By the installation of window units in his own office Mitchell is actually applying one of his own principles. His advice: dealers should attract prospects' attention by the display of room coolers in their natural setting.

LEFT: Dealers and contractors are just beginning to develop the lush domestic market for room air conditioners.



their homes and offices throughout the winter months to keep themselves comfortable when the outside air is cold. Yet, these same people permit themselves to suffer discomfort during the summer months when the outside temperature and humidity are high.

An educated American public will buy and is buying increasingly, room air conditioning equipment designed to give them the same comfort during the summer they now enjoy from heating equipment in the winter.

The room air conditioning unit of today is an improved piece of equipment not to be confused with early models produced before the war. Present-day units are available in console models as well as in the more

popular 1/2 and 3/4-ton window types.

They take up little space in the room. No plumbing connections are required. The unit plugs into an ordinary electric outlet like a radio. The room air conditioner is quickly and easily installed, and will provide years and years of trouble-free service. Most manufacturers back their units with a 5-year guarantee.

Room air conditioners are today a "major appliance," in the same category as the refrigerator, washing machine, and radio. As a major appliance, they are being successfully sold by appliance dealers, as well as air conditioning dealers and contractors, heating and ventilating dealers and contractors, and refrigeration dealers who are, of course, logical

and ideal outlets for the sale of room air conditioners.

Installation and service of present-day equipment present no problem. Where a dealer has no service personnel (as may be the case with furniture stores or department stores), he can readily employ the services of a reliable local refrigeration service organization to make the installation and take care of any service calls.

It is important for the dealer to understand all air conditioners are designed to operate at a certain specified capacity. Most of the trouble experienced to date in selling room air conditioners has been caused by over-zealous dealers who have failed to give the proper consideration to the rated capacity when recommending a unit for a given room.

A must in selling room air conditioners is that installation should be made only within the limitations of the unit's capacity.

Calculations Determine Size

The smart dealer will never sell a 1/2-ton unit where a 3/4-ton unit is required. A safe rule to follow is never to permit the installation of any unit until an inspection of the room has been made. Manufacturers supply their dealers with a simple calculation sheet, which, when filled out properly, immediately determines the size of the unit required.

Room air conditioners offer a unique selling opportunity in that they provide a double market for the dealer. First, there is the vast home market where units are used in bedroom, living room, den, or nursery.

Second, there is the commercial market where they are sold to provide comfort in private business offices, doctors' and dentists' offices, hotel rooms, hospital rooms, etc. The alert dealer will hit hard at both markets.

Newspaper advertising is the fastest way to get customers coming to you for room air conditioners. Even small advertisements used consistently, prove to have terrific pulling power. Direct mail is used also with good effect by many dealers to obtain leads.

One Sale Leads to Others

The main thing is to let a lot of people know that room air conditioners are available and that you handle them. As you build up sales, you will find that the most prolific and productive source of leads comes from satisfied customers. An installation of one unit is likely to sell five more for you. Once people know about the unit, once they see it in action or hear about it, they're your prospects for sales.

It is important for the dealer to display the room air conditioner properly in his store. It should never be left on a table or counter.

Some manufacturers offer a display

stand in which the unit is mounted in a facsimile window (or such a stand can be inexpensively built). This type of display effectively shows what the unit looks like installed in a window. It further permits demonstration of the unit, so that the customer can actually feel the cool air coming from it.

Dealers will have to look far and wide today to find a product which offers opportunities for such universal and profitable sales as are represented in room air conditioners. A further advantage is that profits are not cut down by "trade-ins," a practice which has to be contended with in most other major appliances.

For the dealer seeking to improve his business, profits, and future, room air conditioning is a natural—for these substantial reasons:

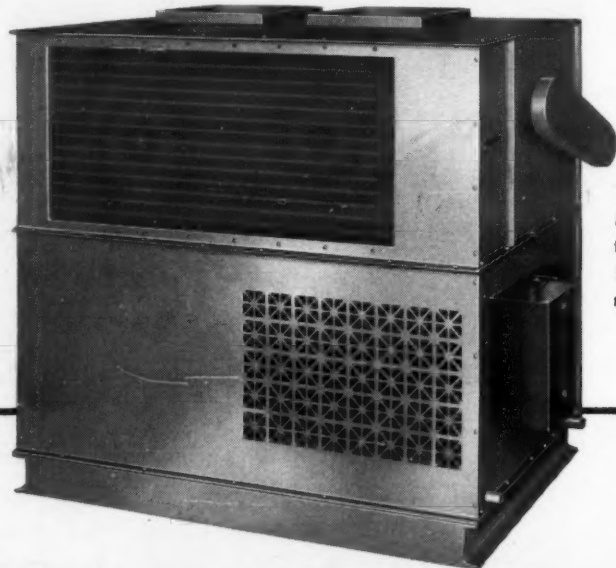
1. The unit of sale is high (average sale is \$400.00).
2. Every person who enters the store is a prospect for a room air conditioner.
3. The business is new; the market is hardly scratched—thus competition is low. The profit margin is good.
4. Room air conditioning is a young business, growing rapidly, and destined for vast expansion.

The average dealer can get into this new and profitable business with very little investment. He has but to stock and display a few units. He has but to make their availability known to the large market that exists all around him in his community. From the most modest beginnings, the dealer can build for himself a profitable business from the start, a business that will fulfill the promise of "selling horizons unlimited."

Some Say

"It's a Great Life"

Will you have One?



Model 10-4000 is a self-contained, duct-type unit operating on Freon 12. Easy to install. An ideal unit where 10-ton nominal rating is necessary.

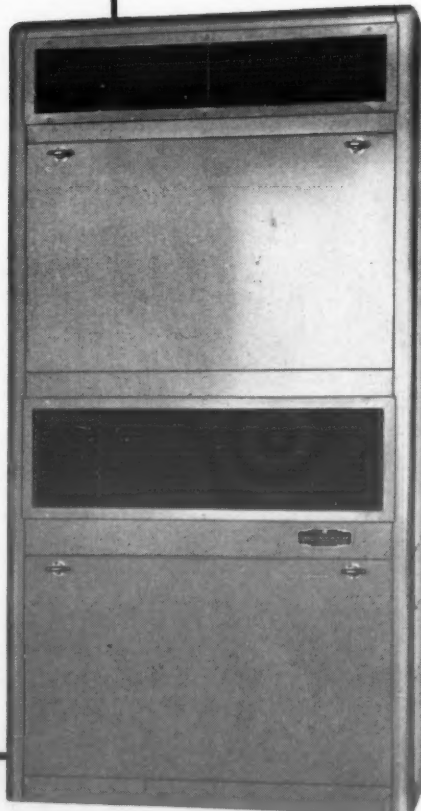
GR Air Conditioning is aimed to please your customers

Here's a line of air conditioning equipment that's easy to sell . . . easy because it combines the features your customers want . . . features they demand.

- Quiet performance . . . moderate operating speed
- Easy to install . . . easy to service
- Long life . . . low upkeep
- Top quality machine at competitive price
- Streamlined and good looking
- Sizes to fit all needs
- Backed by over thirty years in the field

All of which adds up to More Cooling Per Dollar.

Let us show you why General Refrigeration offers more to your customers . . . more to you — why it pays to handle the best. For full information on this top quality line, write Dept. AC-15 today.



The new 5-ton, self-contained Model 520 looks good anywhere. Year 'round use and ease of servicing make it very economical. Heavy-duty Lipman compressor insures long-life service.

GENERAL REFRIGERATION
DIVISION
GR YATES-AMERICAN MACHINE CO. Lipman
Beloit, Wisconsin

Every GR unit is double tested. Compressors are first given a preliminary run-in test. Later, the assembled unit is tested under operating conditions with the refrigerant to be used.



What's New

Heavy Duty Coin Meter Discourages Tampering



CHICAGO—International Register Co., here, has announced production of a new heavy-duty coin meter particularly designed for use in rental refrigerators, washing machines, dryers, radios, television, and air conditioning units.

Because of its extra heavy-duty case, the coin meter, known as Model M-21, is especially suitable for rental appliance installations in areas accessible to the public, such as apartment building basements, housing projects, or tourist courts, the manufacturer said.

To discourage tampering with meter and theft of the coins, the mechanism is housed in a 1/4-in. thick malleable steel case. The solid steel door is equipped with a special, virtually pickproof lock.

The lock is backed up with a heavy reinforcing member to prevent the lock from being driven through the door. The rim of the lock is partially countersunk in the door so that a cold chisel cannot be driven between the lock rim and the surface of the door.

These safety features eliminate much of the direct supervision time required by the operator using ordinary type coin meters.

This meter will handle a wide variety of minute timings. It can collect a dime for every 5 minutes, 10 minutes, etc., up to 60 minutes. The meter operates on dimes only.

Timings can be changed in less than 3 minutes by anyone, merely by exchanging timing gears, which requires only the use of a screwdriver. The coin capacity is 250 dimes (\$25). Prepayment capacity is 1 to 23 dimes.

To facilitate installation, four 1/2-in. diameter mounting holes are provided in the back of the meter case. Thus, the M-21 can be easily attached to a wall, partition, or cross member of an appliance with four heavy-duty bolts.

The mechanism need not be removed from the case to make the average installation. A clearly marked terminal block is provided for connections. Each case is equipped with rubber grommets for cord set connection.

For a free catalog, write to: International Register Co., 2626 W. Washington Blvd., Chicago 12, Ill.

Air Cooler Has 'Rain Drop' Water Distribution System



PHOENIX, Ariz. — Palmer Mfg. Corp. here has introduced a self-contained air cooler weighing 22 lbs. and measuring 16 in. wide and 10 1/2 in. deep.

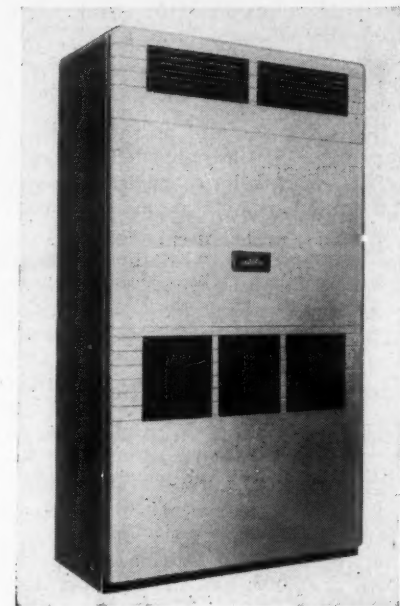
The "Sno-Breze" unit is recommended for cooling offices, hotel rooms, and remote rooms, particularly those above the ground floor where a water connection or drainage system is impractical.

The cooler is equipped with a recirculating water system which operates from a 3 1/2-gal. reservoir and employs a reportedly exclusive "rain drop" water distribution system. It is said to require only filling with water and plugging-in.

A heavy-duty, rubber-mounted motor drives a deep-pitch, four-blade fan, dispersing 800 cu. ft. of filtered, washed, cooled air per minute, according to the manufacturer.

The all-steel cabinet is finished in bronze brown baked enamel hammer-tone.

UsAirco Improves Upright Store Conditioner Line



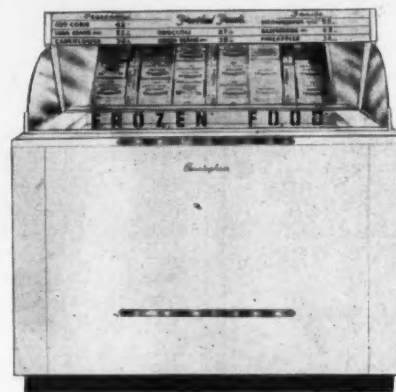
MINNEAPOLIS—A number of improvements have been incorporated in its 3 and 5-ton upright store conditioners for 1949, announces the United States Air Conditioning Corp.

The units have been engineered throughout for silent, vibrationless operation, fine appearance, and efficient performance, the company said.

Designed for installation in the conditioned space or in remote locations for connection to ducts, the units are said to require only a small amount of floor space. Electrical, water, and drain connections must be made.

A fast-selling, profitable cabinet for the Small Merchant Market!

CUNNINGHAM



PRICED TO SELL

Here's a frozen food or ice cream display case that you—and your salesmen—can really SELL, and SELL profitably!

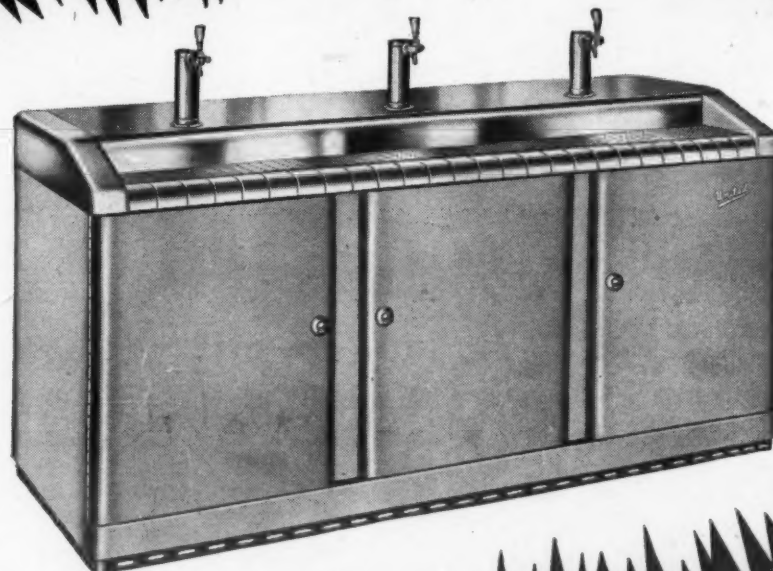
This amazingly efficient, wide-open at the top cabinet holds sub-zero temperatures everywhere in the cabinet (laboratory tests have proved it to hold -9° in a 110° room!).

For Further Information Write

CUNNINGHAM PRODUCTS COMPANY

5555 CONNER AVENUE
DETROIT 13, MICHIGAN

"RADIANT BEAUTY PLUS!"



5 YEAR WARRANTY
on all hermetically
sealed refrigeration units.

United

IN THE NEW KOOLMASTER

Keg Cooler and Beer Dispenser

DESIGNED, ENGINEERED, MANUFACTURED — HUDSON, WISCONSIN

● Radiant beauty truly describes the New United Koolmaster . . . its brilliant stainless steel top contrasts most attractively with the soft brown du Pont Dulux long wearing baked enamel finish.

● Years of satisfying trouble-free service are assured, due to the ALL STEEL construction of the Koolmaster and the rigid testing this fine product is subjected to at the factory.

● The Koolmaster is also available in an all stainless steel exterior at a slightly higher price.

● Thermostatic control, custom designed cooling coils, efficient circulating blower and more than adequate extra-heavy insulation combine to insure a CONSTANT 40° temperature at all times.

● The Koolmaster is one of the first to make their self-contained condensing unit models a compact, one piece unit . . . gives greater space saving under back bar, more pleasing overall appearance.

● Two-keg and three-keg sizes designed with self-contained condensing units or for remote control.

New... ADDED CONVENIENCES

New shiny chrome "push-button" door latches are built flush with cabinet, providing easy and safe access.
New full length concealed hinges are of heavy duty design for long trouble-free service.

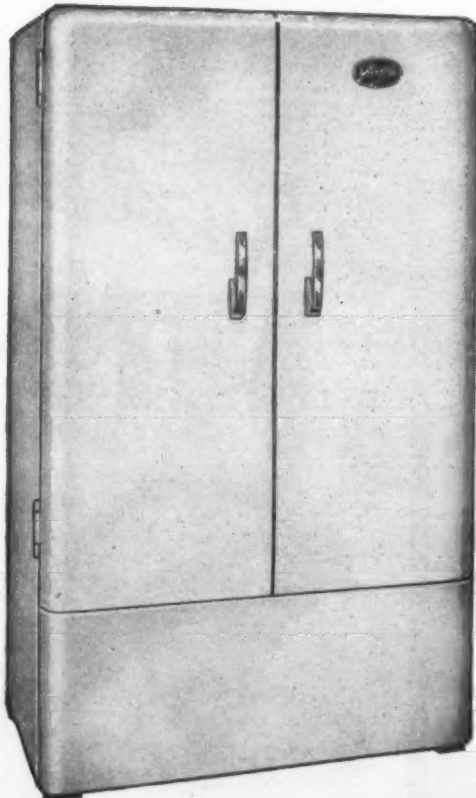
Compare point for point . . . compare prices . . . and you'll buy United!

FOR FURTHER INFORMATION WRITE

UNITED REFRIGERATOR COMPANY • HUDSON, WISCONSIN

Gloekler

Model 20 SD



STAINLESS
INTERIOR

BAKED ENAMEL
EXTERIOR

COMBINATION
ICE CUBER
AND FROZEN
FOOD STORAGE

SEALED IN
UNIT

Manufacturers Agents Wanted for Several Territories.

Gloekler REFRIGERATOR COMPANY
ERIE • PENNSYLVANIA

WANTED SALES ENGINEERS

Alert, aggressive, and resourceful Sales Engineers with background and experience in engineering, estimating, all types air conditioning installations. Give full qualifications, age, and experience. Write Personnel Manager, Airtemp Division, Chrysler Corporation, Dayton 1, Ohio.

COMPRESSOR VALVES, ANGLE VALVES, DEHYDRATORS, STRAINERS, FLARE TUBE FITTINGS, SCREW MACHINE PARTS, SILVER SOLDERED ASSEMBLIES, COPPER BRAZED ASSEMBLIES, SPECIAL ASSEMBLY WORK.



REFRIGERATION VALVE & MFG. CO.
2206-10 Farrand St., Port Huron, Michigan

Wisconsin RSES Plans Weekend Convention In Milwaukee April 23-24

MILWAUKEE — Fourth annual convention of the Wisconsin State Association of the Refrigeration Service Engineers' Society will be staged in the Wisconsin hotel here on the April 23 and 24 weekend, the association has announced.

Five speakers, two "question box" sessions, and election of officers are featured. Mayor Zeidler of Milwaukee will address the annual banquet on Saturday evening.

In addition to the prepared program, a state refrigeration code and other problems that affect refrigeration men will be discussed, according to an invitation sent out to servicemen, urging them to attend whether they belonged to the association or not.

Speakers for the Saturday afternoon session are J. L. McKinley, superintendent of electricity at A. O. Smith Corp.; M. T. Johnson, mana-

ger of automotive finishes at E. I. DuPont Co.; and Otto Ress, director of research at the Mueller Furnace Co.

Sunday morning, Miss J. Cornell Richardson, president of Black Light Products, Chicago, and C. H. Randolph, air conditioning engineer for the Wisconsin Electric Power Co. are scheduled to speak.

No topics for any of the speakers were given in the published program.

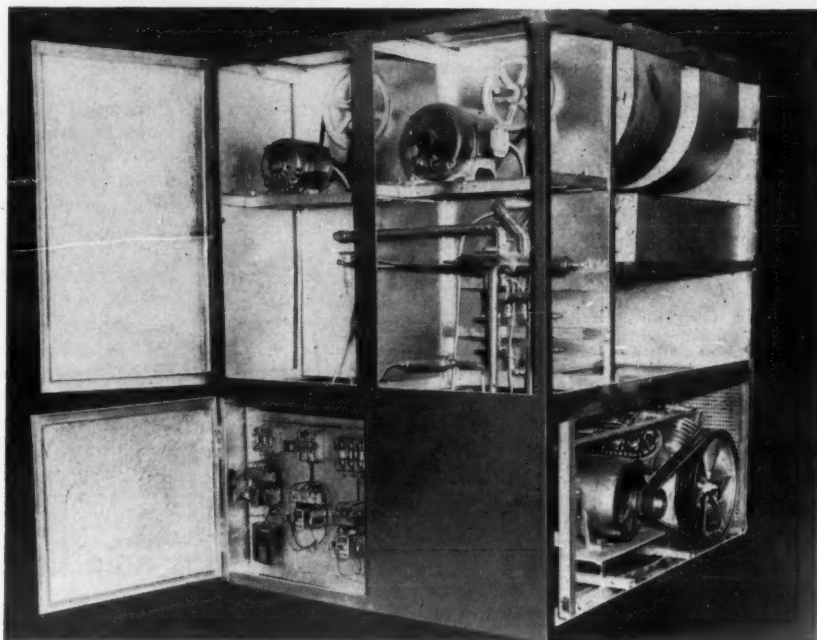
The wholesaler's cocktail party and annual ball will be held Saturday evening.

Attendance at a radio broadcast and a program of continuous entertainment at the hotel have been planned for the ladies.

Corsicana Air Conditioning, Appliance Firm Incorporates

CORSICANA, Tex. — A 25-year charter of incorporation has been granted Corsicana Air Conditioning and Appliance Co. Authorized capital stock is \$5,000, and the incorporators are Joe M. Daniel, George Weinschel, and B. M. Bumgardner.

Reverse Cycle Unit Tested for 5 Years



New Simpli-Cycle System Cuts Heating Costs 67%, Producer Claims

BRAWLEY, Calif. — A "simplified reverse cycle" air-cooled air conditioning system that heats, cools, circulates, and dehumidifies is being manufactured here by the Simpli-Cycle Refrigeration Co. It uses standard components, including Par refrigeration compressors.

D. W. Ransdell, president, said the unit has been on test and in operation in the Imperial Valley for the past five years under temperatures ranging from 18° F. to 122° F.

"Records of the electric company here show that the kilowatt consumption in relation to B.t.u. output for cooling is approximately the same as any other standard air-cooled air conditioning unit in this territory," he stated.

"However, the cost of heating with Simpli-Cycle is approximately one-third of what it is with resistance heating."

Ransdell declared that the Simpli-Cycle is designed to provide 60,000 B.t.u. of cooling at 109° F. dry-bulb or 80° F. wet-bulb, and 74,000 B.t.u. of heating at 35° F. Manually operated valves switch the unit from heating to cooling or vice versa.

The Simpli-Cycle is 66 in. long, 54 in. wide, and 74 in. high. Frame is of galvanized iron finished in tool grey. The conditioned air section has two 12-in. blowers and a 4-row stagger tube Recold coil. The waste air section is equipped with two 14-in. blowers and a 6-row coil. Both coils are equipped with Ransdell headers.

Heating and cooling valves are identified by a red or green color. By opening and closing these, regulating fan motor switch and compressor motor switch, setting the heat or cooling thermostat, the unit reverses its cycle.

Air Conditioning Planned For 5-Acre Bakery Bldg.

OMAHA, Neb. — A new baking plant to be erected here, providing five acres of floor space under one roof, will be completely air conditioned, according to Milton Petersen, president of P. F. Petersen Baking Co.

The firm has purchased a 10-acre tract near 72nd and Dodge Sts., and construction of the new plant will begin in about a year, Petersen said.

The company now has the largest bakery in Nebraska at 12th and Jackson Sts. Petersen said the new plant will be an ultra-modern bakery of greater capacity and efficiency, with all manufacturing and distribution on one floor.

Another Ajax Co. Is Chartered

BATON ROUGE, La. — Charter of incorporation has been granted Ajax Air Conditioning of Louisiana, New Orleans, according to Wade O. Martin, Jr., secretary of state. The firm lists \$10,000 capital stock.

SACRIFICE SALE! 50% Of Cost!

Meat cases, low temperature cabinets, walk-in coolers, reach-in boxes, ice cream cabinets—all manufactured by leading industry manufacturers. In addition, some repossessed equipment of same type in good condition. This merchandise was secured through foreclosure on floor plan arrangement.

COMMUNITY ACCEPTANCE CORP.
765 WEST 69TH STREET
CHICAGO 21, ILLINOIS

Here's what ELECTRICAL MERCHANDISING says about "The Marshal's Baton"...



"The Marshal's Baton"
A comprehensive knowledge of merchandising, combined with a refreshing approach, makes George Taubeneck's book on specialty sales management well worthwhile

SHOOTING the breeze with George Taubeneck can be a pretty exhilarating experience. Strictly speaking, it takes two people to carry on a dialogue, but the publisher-editor of *Air Conditioning and Refrigeration News* manages somehow to impart a give-and-take, conversational atmosphere to his writing. In "The Marshal's Baton" (Conjure House, Detroit, \$5) you'll find a discussion of specialty sales management which is about as informal as it could be. It's as if Mr. Taubeneck were anticipating argument all along the line, and throwing out his rebuttal off the cuff. And it's made all the more refreshing by the humor interspersed throughout. A sizable booklet could be compiled just by lifting from the text all the illustrative anecdotes (along with some not so illustrative, as the author is the first to admit).

Napoleon Said It

The book's title is derived from a remark of Napoleon's that "Every private carries a marshal's baton in his knapsack." It is dedicated to the private come marshals in the front office—What it adds up to is a survey, in general terms, of everything a specialty sales manager ought to know. A tall order; no wonder it takes 570 pages to do the job.

It's All There

Those 570 pages make fast reading. Under headings like "It's a Great Pro-

fession," "Price-Making Is Like Walking a High Wire—And How!" "The Distributors? God Bless 'Em!" and 19 others, Mr. Taubeneck runs through the whole merchandising field in a style which is breezy, but not so breezy that it obscures a wealth of information and advice. He knows his stuff and he holds nothing back. But—and it's a big "but"—he insists, again and again, that there are a million essentials that a good specialty sales manager can't be told. He can learn them only through doing his job, since that job involves the always variable human equation.

High Brass Helps Out

To bolster his statements, Mr. Taubeneck quotes from a number of eminent sales executives, many of whom contributed their comments expressly for this book. Their remarks deal not only with specific, practical matters, but with business ethics and philosophy, and they deserve the permanent form which the book gives them.

Wide Application

Because the main concern of "The Marshal's Baton" is helping to coordinate manufacturing and production with sales on the distributor, dealer and consumer levels, it holds much of interest to almost anyone involved in business. And the appliance field comes in for more than its share of scrutiny. There is little point in trying to cover too much in it. Investigate it for yourself. You won't be sorry.

Reprinted by permission from Sept. 1, 1948 issue of *Electrical Merchandising*

And this is just a small sample of critical comment which has hailed THE MARSHAL'S BATON as a significant contribution to the science of sales management. It is written in the light of merchandising problems today and tomorrow. It's a brilliant new source of knowledge and wisdom which can be of tremendous importance to you.

ORDER TODAY — USE THIS COUPON

Please send copies of THE MARSHAL'S BATON

☐ Check Enclosed ☐ Bill Me.

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Address

City..... Zone..... State.....

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450 W. FORT ST., DETROIT 26, MICH.

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AUTO-LITE FOR TEMPERATURE INDICATION



Model F-1 Thermometer priced from \$22. Choice of Temperature Ranges.

Dependable temperature indication by Auto-Lite points the way to many savings in manufacturing and storage operations. It is sensible economy to have one of these low-priced accurate thermometers wherever temperature is an important factor. Write for folder describing the many types and styles of Auto-Lite Thermometers, dial sizes, temperature ranges and prices.

THE ELECTRIC AUTO-LITE COMPANY
INSTRUMENT AND GAUGE DIVISION, DEPT. A-4
TOLEDO 1, OHIO
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INDICATING & RECORDING THERMOMETERS

Heads Refrigerator Sales



J. J. ANDERSON

Westinghouse--

(Concluded from Page 1, Column 5)

In his new job, Anderson will be responsible for the sales activities for Westinghouse refrigerators and will report to G. H. Meilinger, manager of the department.

Heck had been merchandise manager of the household refrigeration department since 1943. He joined Westinghouse in 1936, was transferred to the Westinghouse Electric Supply Co.'s Cleveland, Ohio, office in 1940 and returned to the Mansfield headquarter's office in 1943.

In his new post, Heck will be in charge of supplemental distribution in the plumbing and heating industry of Westinghouse products that logically are installed and serviced by such distributors.

Newcomb reported that a national franchise agreement for these products has been negotiated with the American Radiator and Standard Sanitary Corp., and that Westinghouse is now in the process of franchising the organization's various branches throughout the country.

Westinghouse plans to add its dishwasher to the products to be distributed through American Radiator and Standard Sanitary and other distributors who may be added under this new program, as well as any future products the division may add to its present full-line that might flow through this type of distributor.

Minneapolis Dealers Plan Trip

MINNEAPOLIS—The Electric Appliance Dealers Association, forgetting business for a brief period, are sponsoring a three-day fishing trip on Lake Mill Lacs, Minn., June 17-19 for all members of the electrical industry.

YOUR HAJOCA BRANCH
is the **ONE-STOP**
HEADQUARTERS



for AIR CONDITIONING
and
REFRIGERATION
SUPPLIES AND PARTS

Hajoca stocks standard equipment for the installation and maintenance of commercial air-conditioning and refrigeration plants at Branches from New Jersey to Florida. Famous-name products like Detroit, Ranco Controls, Peerless Coils and a complete stock of pipe, valves and fittings are always on hand.

Hajoca's facilities and experience mean prompt and efficient servicing of your ordinary and extraordinary needs to keep your installation and maintenance jobs profitable.

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CORPORATION

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(Erie Ave. Branch)
Lansdowne
Reading

Georgia:
Columbus
Florida:
Jacksonville

New Jersey:
Camden
Tennessee:
Chattanooga



Theater Cooling Standards Sought--

(Concluded from Page 1, Column 3)

Lack of agreement among theatermen surveyed as to what air conditioning actually is, was so remarkable that the magazine undertook a brief study of the nomenclature used by manufacturers and dealers. It said it found some extreme cases prevailing.

For example, the publication stated, one manufacturer called a simple electric fan "an air conditioner." Others mislabeled their products, lending towards misconception on the part of prospective users of air conditioning equipment, it was claimed.

According to the magazine, the survey disclosed that exhibitors are confused over such "widely advertised terms as 'evaporative cooling' and its application by at least one manufacturer to simple blowers which evaporate the patrons' perspiration while another applied it to a system of blowing air through sprays of water, cooling the air by evaporating the water."

Indicative of exhibitors' confusion, it was pointed out, is the fact that of 71% who said they were not familiar with evaporative cooling, 14% were using it in their own theaters.

The survey disclosed that about 70% of all U. S. motion picture theaters now use some form of "air conditioning." Equipment ranges from simple blower systems to complete temperature and humidity control systems involving mechanical refrigeration.

An additional 10% said they planned to install some form of conditioning, while another 3% indicated they contemplated improving existing equipment. Twenty per cent replied that they have no air conditioning equipment and do not intend to install any.

Modern air conditioning is reasonable in cost, according to a majority of exhibitors queried. Sixty-six per cent felt costs were "reasonable," compared with 28% who thought they were "rather high" and 6% who said they were "very high." However, among the latter, many qualified their comments by reference to such items as high electric rates.

On the average, theaters used their conditioning equipment about five months out of the year. Of all ex-

Air Conditioning Needs Better Engineering, Says James of McQuay

MINNEAPOLIS—More intensive engineering lies ahead of the air conditioning industry as the answer to a return to a normal competitive market, Byron E. James stated here on assuming his new post as chief engineer of McQuay, Inc., air conditioning and refrigeration equipment manufacturer.

True air conditioning still is often confused with indiscriminate use of the term to describe devices which do not begin to meet sound engineering principles," he asserted.

"It is a job for the industry—and one that cannot be neglected as we return to competitive conditions," he said, "to do an engineering job that will combine higher quality and lower cost of product, more efficient operation, and new applications of present products and services."

James came to McQuay from Liquid Carbonic Corp. where he held the positions of chief engineer and general manager. He is a graduate of the Massachusetts Institute of Technology and has served with York Corp. prior to his joining Liquid Carbonic.

With McQuay he assumes responsibilities of new product development, present product improvement and application, production inspection, and patents, according to R. J. Resch, president of McQuay, Inc.

Marohn Elected Noma Treasurer

NEW YORK CITY—Election of James A. Marohn as treasurer of the Noma Electric Corp. was announced recently by Henry Sadacca, president. Marohn was formerly controller and assistant treasurer, a post now filled by Fred A. Schwartzstein. He joined the firm in 1946.

hibitors offering information on this point, 62% operated the equipment not less than four nor more than six months.

Year-round systems that comprise both heating and cooling, plus the comparatively few year-round cooling systems, totaled only 8%. Only one used it three months per year and none less than two months.

Regarding types of systems in use mechanical refrigeration was installed in 35% of all theaters. Another 32% utilized some form of evaporative or washed air cooling system. Passing incoming air through coils carrying cool well water is a technique used by 11% of the theaters, while only 8% relied on simple blowers alone.

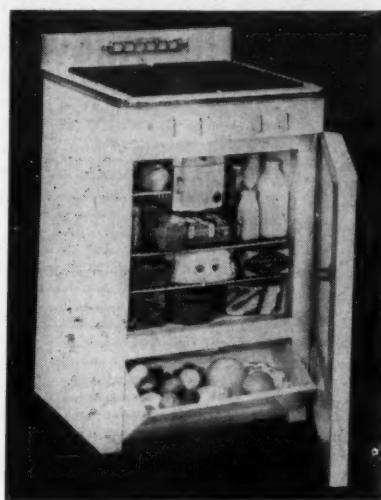
Among miscellaneous arrangements revealed by the survey was the use of city water—rather than well water—in coils past which the incoming air is blown—a method limited to use where rates are low and where the temperature of the city water stays low on hot summer days when cooling is most needed.

Of the 10% of theaters which plan to install conditioning equipment, the majority still have not made their choice of systems. As one theaterman stated: "I intend to install the most practical system I can find."

The same applies to the 3% which plan to improve existing installations.

Although no air conditioning of any kind is now used or even planned for use by 20% of the theaters queried, mainly because a system is "too expensive," no exhibitor contacted declared that his climate made air conditioning superfluous.

Has Gas Cooking Top



Ultra-Cold Model 400-G.

'Combination Unit'--

(Concluded from Page 1, Column 4)

a 2-tray ice maker, a drip pan, three shelves, a self-closing evaporator door, a vegetable storage bin of approximately 1 cu. ft. capacity, and a hermetically-sealed condensing unit.

The combination refrigerator and gas range has been designated model 500-G. Its range section is comprised of two regular-size burners and two "giant" burners, a thermostatically-controlled oven measuring 17 x 14 x 20 in., and an adjustable, roll-out, ball-bearing broiler.

Topping the burner section are four vitreous-enameled, cast-iron grates designed to prevent slipping

or tipping of utensils.

Over-all dimensions of model 500-G are: length, 46 in.; height, 36 in.; depth, 25 in. Carrying both AGA and UL approval, it comes in either chrome or porcelain tops.

Model number of the combination refrigerator and gas cooking top is 400-G. It has four full-sized burners beneath which are two drip trays. Above the burners is a 4-section grate finished in black. This model measures approximately 40 in. high, 24 1/4 in. wide, and 26 1/2 in. deep.

Among construction features of both models are Fiberglas insulation, plastic trim in a variety of colors, and triple chrome-plated hardware. Each of the burners of both models is fed by a shielded pilot light.

Other models are available which use electricity.

Loudon Trims Milk Cooler, Walk-In, Freezer Prices

MINNEAPOLIS—Price reductions on its walk-in coolers, milk coolers, and home freezers have been announced by Loudon Mfg. Co. here.

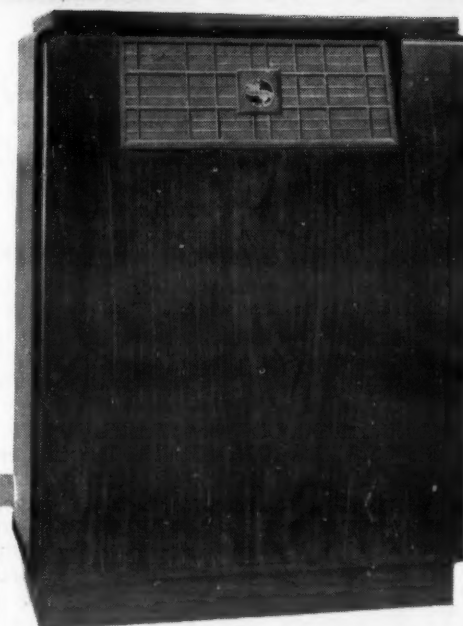
The company said prices on the walk-ins have been reduced from 10 to 15 cents per sq. ft. and those on milk coolers from \$20 to \$100. Home freezers have been lowered \$10.

At the same time, Loudon announced introduction of a self-contained bar for hotels, restaurants, and homes.

Creamery Becomes Locker Plant

FULLERTON, Neb.—C. O. Balcomb, formerly of Bemidji, Minn., is installing a frozen food locker plant in the former Fairmont Creamery.

REFRIGERATED AIR CONDITIONING INSTALLED WITHOUT "WRECKING THE PLACE"



ASRE STANDARDS
Row of Coils—6
Sensible 10,250 B.T.U.
Latent 2,230 B.T.U.
Total 12,480 B.T.U.

HERE'S ECONOMY and EFFICIENCY IN ALL-YEAR AIR CONDITIONING

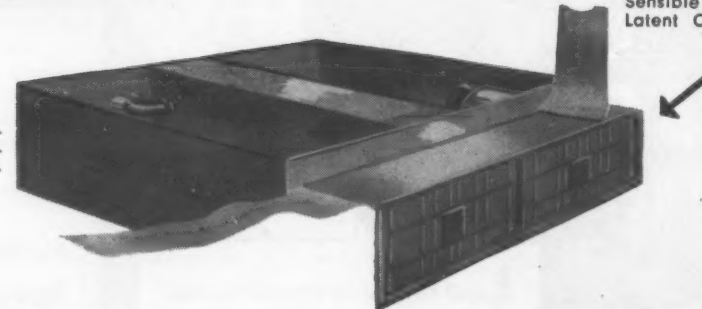
All the advantages of a Central System without the expensive duct work and the accompanying evils of redecoration.

All the advantages of a single unit system, without blocking windows, winter removal, or compressor noise and heat.

This same system using 'chilled or hot water' instead of Freon will provide year around temperature control.

Large coil area gives almost 100% more dehumidification.

ASRE STANDARDS
Rows of Coils..... 4
Sensible Cooling..... 7,297 B.T.U.
Latent Cooling..... 1,903 B.T.U.
Total..... 9,200 B.T.U.



- 100% GREATER DEHUMIDIFYING ACTION
- ONE-THIRD SPACE OTHER UNITS REQUIRE
- INSTALLED WITHOUT COSTLY REMODELING AND REPAIRS
- NO NEED TO SIT IN WINDOW
- NO DUCT WORK

- NO COMPRESSOR NOISE OR VIBRATION
- LOWER INITIAL COST
- LOWER OPERATING COST
- EFFICIENT AND ORNAMENTAL
- NO NEED TO BLOCK OFF, OR TAKE OUT IN WINTER

YOUR TERRITORY MAY STILL BE OPEN WRITE-WIRE-CABLE

Manufacturers of All Copper Refrigerant Coils from 1 to 20 tons which, when installed in existing ductwork of any central heating system, will provide refrigerated air conditioning.

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AIR CONDITIONING

Mfrs. International Manufacturing Co.
515 W. Main St. Oklahoma City 1, Okla.
Cable Address—"INTIME" Plant: 4028 N. Barnes

5-Ton Air Conditioning Unit Suspended from Garage Ceiling, Saves Funeral Home Floor Space, Allows Clearance for Car



J. W. Gregg (right), Frigidaire dealer who planned the air conditioning system for the Nale Funeral Home in Fairfield, Ill., explains the operation of the fan switch control of a remote-type floor air conditioner, which serves the family reception room. Removable panels in either end of the cabinet affords easy accessibility to the controls and expansion valve.



Hung from the ceiling of the garage of the Nale Funeral Home, this 5-ton suspended-type Frigidaire unit supplies conditioned air to the 200-seat chapel. The lower duct draws fresh air from the outside and mixes it with room air, ventilating the chapel. The upper duct, which is insulated to reduce heat losses, carries the cool air to the conditioned area. All plumbing and electrical connections have been installed high enough to allow clearance for automobiles. This type of installation saves floor space.

FAIRFIELD, Ill.—How compactly designed air conditioning equipment can be applied to funeral homes was demonstrated here recently in the installation of two Frigidaire systems in the Nale Funeral Home. The two systems were set up to serve the chapel, family reception and private rooms, and the office.

The chapel, which has a seating capacity of 200, is conditioned by a suspended type unit of 5-ton refrigerating capacity. J. W. Gregg, Frigidaire dealer who planned the installation for Funeral Director E. A. Nale, hung the 5-ton air conditioner from the ceiling in a garage at the rear of the chapel.

With all ducts, plumbing, and electrical connections in place, there is sufficient clearance for automobiles below. A large duct connects the air conditioner with three concealed outlets in the ceiling of the chapel.

3 UNITS FOR RECEPTION ROOM

Two private family reception rooms and the office of the funeral home are air conditioned by three remote floor units. These floor-type air conditioners are operated by a multiple hookup arrangement stemming from a single 3-hp. Frigidaire water-cooled reciprocating compressor. Because these floor units are only 11½ in. deep, 25 in. high, and 46 in. long, it was possible to install them in out-of-the-way locations.

A 10-ton capacity, forced-draft tower, installed on the roof of the garage directly over the 5-ton conditioner serving the chapel, supplies water to the two compressors operating the air conditioning systems.

Like most funeral homes, the chapel and private rooms of the Nale home are used intermittently, depending upon demand. By "zoning" the conditioned areas, operating costs of the air conditioning equipment can be kept at a minimum. The package conditioners can be operated or shut down in the chapel, reception room, or office as required.

"These new individual room air conditioners operate quietly," Nale commented, "and have proved especially helpful in this phase of our service. We operate the units separately or in multiple as needed. This keeps our operating costs on a low level."

FLOWERS KEPT FRESHER

Air conditioning in the Nale home is proving its worth in many ways. Cool air offsets the body heat generated by large groups of visitors attending services. Flowers remain in better condition over longer periods.

Because doors and windows can remain closed during services, much of the outside noise, dust, and other nuisances are eliminated. Because dust and grime are filtered out of the air, cleaning and redecorating is reduced substantially. The conditioned air is easier on drapes, furnishings and other expensive appointments.

"Above all," Nale concluded, "because it is a comfort-making factor, air conditioning seems to reduce the nervous tension among visitors."

Nale also operates another funeral home in Albion, Ill., which is air conditioned.

Miller Electric Named Carrier Associate Dealer In West N. Y.

MEDINA, N. Y.—Appointment of the Miller Electric Co. as an associate dealer in the western New York territory for products of Carrier Corp. has been announced by the manufacturer.

Bert G. Miller, president of the local firm, is on the board of directors of the International Refrigeration Service Engineers Society, is president of the society's Buffalo chapter, and is first vice president of the Empire State Association, R.S.E.S.

Air Conditioning Completed In Airline Offices at LaGuardia

NEW YORK CITY—The Kooler-air Conditioning Co., Inc. has just completed the air conditioning of the field offices of the North East Air Lines at LaGuardia Field, N. Y., with three D.C. 1-ton Remington packaged air conditioners, E. V. Eichler of the firm announced recently.

CLASSIFIED ADVERTISING

RATES for "Positions Wanted" \$2.50 per insertion 50 words or under. 5¢ ea. additional word.

RATES for all other classifications \$5.00 per insertion 50 words or under. 10¢ ea. additional word.

ADVERTISEMENTS set in usual classified style. Box addresses count as five words, other addresses by actual word count.

POSITIONS WANTED

FIFTEEN YEARS broad experience in Illinois, Florida, and South Carolina with domestic, commercial, and industrial refrigeration and air conditioning sales, service, and engineering. Now unemployed and living in northeast Georgia. Want part or full time connections not requiring moving residence. E. L. GEDNEY, Santee, Georgia.

POSITION WANTED by first class commercial refrigeration man. 20 years experience all types of installation and service. Must be furnished transportation. GEO. A. KERSEY, 8240 Brenner, St. Louis 14, Mo.

EXPORT AND domestic—sales engineer presently employed large refrigeration export house, handling products of major refrigeration and air conditioning manufacturers. Know sales, installation, service and correspondence. Desires connection with solid, wide awake, straight shooting organization. BOX 3144, Air Conditioning & Refrigeration News.

ERECTION AND service engineer: age 42, now located in Canada, fully experienced in high and low pressure work, booster systems, able to handle the largest installations independently. Now employed, wants change for larger scope and possibilities. Can go anywhere. BOX 3145, Air Conditioning & Refrigeration News.

COMMERCIAL & AIR conditioning engineer, project engineer, designing refrigeration equipment & plants, supermarkets, locker plants, restaurants, theaters, etc. Some estimating, write specifications and proposals. General service manager, factory representative. Thirty years experience. Go anywhere, prefer Illinois. Would take low salary on a partnership deal. Excellent reference. Write BOX 3146, Air Conditioning & Refrigeration News.

AVAILABLE SALES representative for established manufacturer of refrigeration and air conditioning components including condensing units, condensers, evaporators, controls or accessories. Fourteen years engineering experience, four years sales experience. Age 38. Cover Eastern Pennsylvania, New Jersey and Delaware. BOX 3150, Air Conditioning & Refrigeration News.

SERVICE MANAGER. Experienced field and contract service. All phases manufacturing, service manuals, training schools, laboratory. Installations, all sizes, refrigeration and air conditioning. Member A.S.R.E. and R.S.E.S. Available now. BOX 3153, Air Conditioning & Refrigeration News.

SALES ENGINEER, age 37. Eleven years field experience refrigeration controls with present employer contacting manufacturers, jobbers, dealers. Desire only limited traveling. BOX 3154, Air Conditioning & Refrigeration News.

SALES ENGINEER, 2½ years experience in air conditioning and refrigeration application and estimating for large manufacturer, desires location in New York area. Graduate M.E. 31 years old, presently employed. BOX 3156, Air Conditioning & Refrigeration News.

POSITION AS manufacturer's representative desired by highly educated man experienced in commercial refrigeration sales. Indiana, Ohio, and Kentucky territory preferred. A-1 references. Write BOX 3157, Air Conditioning & Refrigeration News.

PRODUCTION MAN—been actively engaged in the manufacturing of refrigeration equipment for the past fourteen years. Familiar with the problems of production, engineering, inspection, and service. Seeks employment with some reliable company where ability and experience will get results. Salary open. BOX 3158, Air Conditioning & Refrigeration News.

POSITIONS AVAILABLE

SALES ENGINEER, air conditioning. We have openings for two men. Both must be thoroughly experienced in engineering, estimating and selling. One on jobs to 50 tons; the other to 10 tons. This is a real opportunity offering an interesting and permanent future with one of Carrier's leading distributors, established in 1922. Guaranteed salary and liberal commission. Answer giving full details of experience, age, etc. Replies confidential. Interview at our expense. JAMES AND ROACH, INC., 282 E. Milwaukee Ave., Detroit 2, Michigan.

EXPERIENCED COMMERCIAL refrigeration service engineer wanted for aggressive sales and service company located in Alabama. In business since 1932. Must be an air conditioning commercial and industrial installation service man with at least 10 years experience. State previous experience and references. BOX 3148, Air Conditioning & Refrigeration News.

WANTED—A man thoroughly experienced in the repair and rebuilding of hermetically sealed refrigeration units. Should be able to take charge of and direct others in this type of work. State fully your background, experience, former employers, etc. Write BOX 3152, Air Conditioning & Refrigeration News.

EQUIPMENT FOR SALE

COMPRESSOR. WESTINGHOUSE 60 ton evaporative cooled type. Used on air conditioning application but in good condition. Bargain! \$2,000.00 F.O.B. Cincinnati. BIMELO CO., Cincinnati, Ohio.

SEALED UNITS rebuilt and exchanged. Prompt service on Coldspot (sealed & semi-sealed), Chieftain, Gale, Tecumseh, Norge and many others. One year guarantee. Write for price list and shipping instructions. BRIGHTON, 3906 Joy Rd., Detroit 6, Michigan.

SPECIAL—DOUGH retarders: 72 bun tray—6 doors, blower coil and valve, remote, \$500.00; 96 bun tray—8 doors, blower coil and valve, remote, \$650.00. LOUDON SALES INC., 2524 27th Ave. So., Minneapolis, Minn.

CHIEFTAIN HERMETICS (new): ¼ H.P. \$42.00 ea.; without condenser \$39.00; in lots of 10 \$37.00 ea.; in lots of 10 less condenser \$34.00 ea. New thermostatic expansion valves: Sporlan Stand. ½ T M ¾ x ½ \$5.50 ea.; Sporlan Stand. ½ T F ¾ x ½ \$5.50 ea.; Detroit 893 ½ T F 30 10° super ¼ x ¼ P. \$4.50 ea.; Detroit non-adj. 893 X ½ T F 15 3° super ¼ x ¾ for home freezers or domestic \$1.50 ea. Seals, GE compressor parts and fittings at ½ price. Send for surplus sheet. NORTHLAND REFRIGERATION COMPANY, 1742 Wabansia Avenue, Chicago 22, Illinois.

SPONGE RUBBER tubing—¾ I.D. by ¾ O.D. in 3 ft. lengths, 13¢ per length. Minimum quantity 100 lengths. Sample on request. We have this on hand as a result of a change in design, and, of course, it is in perfect condition. PACIFIC MANUFACTURING CORP., 7500 Stanton Avenue, Cleveland 4, Ohio.

OVERSTOCKED ON Victor dry storage bottle coolers. Brand new, in original crates. Eighteen 198S, 31 case capacity, \$195.00 less units with housing and three with units \$286.00, present list \$481.25, and \$666.00. Prices F.O.B. Philadelphia, Penna. Call LOcust 4-1100 or write Miss Kesselman, RAYMOND ROSEN & COMPANY, 2121 Market Street, Philadelphia, Penna.

SUBJECT TO prior sale: Hermetic Chieftain units: ¼ H.P.—\$44.50; ½ H.P.—\$44.50. Other well known hermetics: ¼ H.P. fan cooled—\$52.50; ½ H.P. fan cooled—\$57.50; ¾ H.P. fan cooled heavy duty—\$59.50; 1 H.P. fan cooled heavy duty—\$69.50. Open units—standard makes: ¼ H.P.—\$56.00; ½ H.P.—\$64.50; ¾ H.P.—\$84.50. 1½ H.P. air or water cooled Universal Cooler—\$199.00; 2 H.P. air or water cooled Universal Cooler—\$224.00; 3 H.P. air or water cooled Universal Cooler—\$259.00. All above units new and in original crates. Air cooled condensers: 3 row, 1 pass, 13" x 12" x 3"—\$3.95; 4 row, 4 pass, 13" x 11" x 4¼"—\$4.45; 4 row, 2 pass, 18" x 12" x 4¼"—\$6.25. Upright receiver tanks, shut off valve, 4" x 11"—\$2.65. Penn low or high pressure control type, 260 Apol—\$3.75. Detroit Lubricator L. P. control—\$4.00. G. E. blower fan motor with fan—\$4.50. Superior heat exchanger, 13" overall, ¾" x ¾"—\$4.75; Mueller heat exchanger, 14½" overall, ¾" x ¾"—\$5.00; Mario heat exchanger, 21" overall, ¾" x 1¼"—\$7.50. Kramer Trenton panel blower complete with heat exchanger, ½ to ½ ton—\$29.00. Superior master drier, ¼" flare x 1¼" x 5¼"—\$75. Weatherhead drier, ¼" flare x 1¼" x 6¼" (lots of 10)—65¢. U. S. "Freon" gauge 4¼" face, 30" vac. 150# or 300# with corresponding temp. scale, red warning hand, mounting holes—\$4.50. Scientific dial thermometer, 4¼" face, minus 40 to plus 120, 5 ft. tube, mounting holes—\$4.50. Ranco type k.w. 412 cold control complete—\$4.00. WALTER W. STARR, 1207 George St., Chicago 13, Ill.

BUSINESS OPPORTUNITIES

WILL SELL paying compressor repair shop due to ill health. Oldest, largest, and best equipped shop in Midwest, complete stock modern tools plus electric bake oven. Inventory January, 1949: \$23,500, including approximately 600 rebuilt compressor bodies. Will discuss terms with reliable interested party. SCHULTZ REFRIGERATION, 1523 Putnam, Detroit, Michigan.

BUSINESS FOR sale: refrigeration and air conditioning sales and service. Air conditioning field unlimited. Established business. Long season. Will sell all or part at inventory, about \$2,000.00. Offer open two weeks. I have other interests in Ontario, Canada. BOX 606, Edinburg, Texas. Phone 857.

GOING REFRIGERATION business. Reason for selling: owner's sudden death. Experienced help available. Buyer privileged to buy home and shop combination if desired. Price including equipment, two trucks, goodwill: \$7,500.00. House and shop: \$7,500.00. Located in community of 20,000, plus surrounding towns. BOX 3151, Air Conditioning & Refrigeration News.

FOR SALE: Michigan's leading independent wholesale hermetic rebuilding business. Completely equipped plant, office equipment and new trucks. Good local and out of state business the year round. Will sacrifice for \$12,500 due to ill health. Building 22' x 125' available for long lease at low rent. BOX 3155, Air Conditioning & Refrigeration News.

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Refrigeration Problems

and their Solution

by Paul Reed

For Service and Installation Engineers



Paul Reed

Refrigerants (4)

Ammonia was a very satisfactory refrigerant for the big installations, especially as to its operating pressures and temperatures, net refrigerating effect, displacement, critical pressure and temperature, horsepower per ton, efficiency, cost, and similar properties and characteristics.

But there are other characteristics of a refrigerant that, for some installations are just as important as those mentioned above, if not more so. Among these are: ease of determining the location of leaks; stability, that is, what happens when there is water and/or air in the system with the refrigerant; what effect the refrigerant or mixtures of refrigerant and water have on the materials of which the system is built; whether the refrigerant is flammable; how toxic it is, that is, how unsafe it is for human beings to breathe; and whether or not the refrigerant is soluble in oil. Some of these questions ammonia satisfied very well; others it answered in not so satisfactory a manner.

FINDING AMMONIA LEAKS

Ammonia has a peculiar characteristic; if ammonia vapor comes into contact with sulphur dioxide, a white "smoke" is formed. Therefore, it is only necessary to pass a lighted sulphur candle around near joints, stuffing boxes, and other places suspected of leaking ammonia. If a white "smoke" appears, that joint is leaking ammonia. This makes a very effective leak-test that maintenance men can easily use.

MOISTURE IN AMMONIA SYSTEMS

Ammonia is one of the more unstable refrigerants. It combines readily with moisture to form "aqueous ammonia" or ammonia water, as it is sometimes called. This circulates as a liquid throughout the system, and as it is quite corrosive to copper or copper alloys, brass and bronze, those metals cannot be used in ammonia equipment, for some moisture is always present in refrigerating systems.

Although this deprives the ammonia system of the use of copper, brass, or bronze, three very useful metals for bearings, bushings, valve seats, and similar parts, the affinity of ammonia for water is the basis for the use of ammonia in the absorption type refrigerating system which was very popular even in the large tonnage sizes up until a few years ago, when the increasing use of electric motor drive caused the swing of popularity to the compression system and away from the absorption type.

There is some advantage, however, in ammonia or any other refrigerant being able to absorb some moisture. In actual practice, it is very difficult to avoid having some moisture in the refrigerating system, and if the refrigerant can absorb this small amount of moisture without forming compounds that exceed the corrosion limit, it is a big operating advantage, for "freeze-ups" at the expansion valve do not occur, and this is a frequent cause of trouble in systems using refrigerants that can hold very little moisture.

FLAMMABILITY AND TOXICITY

Ammonia is "moderately flammable," in that it will burn or even explode if it is mixed with just the right proportion of air (from 16 to 25% air by volume). Care must, therefore, be exercised in exposing it to flames, for serious fires and/or explosions may result.

Ammonia is also toxic, that is, it is quite unsafe to breathe. Even in very small concentrations in air (as little as 1/4 of 1% by volume) it is dangerous.

AMMONIA NOT OIL-SOLUBLE

Ammonia does not dissolve in ordinary petroleum-base lubricating oil as do most of the present-day so-called "low-pressure" refrigerants. This has some advantage in the compressor crankcase, for the oil

there is not thinned thereby, but it is a disadvantage in other parts of the system. It means that liquid refrigerant and oil tend to separate and "stratify" in the receiver, evaporator, accumulator, and other vessels.

The oil is not kept swept out, and therefore, if not drained out occasionally by hand, takes up an increasing amount of space and thereby lowers the capacity or refrigerating ability of the vessel. Liquid ammonia is lighter than oil, so the oil sinks to the bottom, separate from the refrigerant, and can be drained off if suitable drain cocks are provided. This is one of the duties of maintenance men in an ammonia plant, that is, to keep the oil drained from the evaporator, receiver, and accumulator, and replenish the oil in the compressor crankcase.

Thus, for the ice-making and cold-storage plant and brewery that called for large tonnages and large equipment, ammonia was, and still is, exceedingly well suited.

PROS AND CONS OF AMMONIA

On the favorable side were: low cost, easy availability (a very potent factor in the early days of mechanical refrigeration), high net refrigerating effect per pound, moderate pressures, relatively low displacement, high efficiency, low horsepower per ton, and ease of locating leaks.

On the unfavorable side were: highly toxicity, flammable enough to be dangerous, inability to use copper or its alloys, and its insolubility with oil.

Although these large installations contain hundreds of pounds of ammonia and the consequent hazard of fire, explosion, or toxicity is therefore present on a very large scale, the hazard is somewhat reduced by the fact that such installations are constantly attended by trained men.

SAFETY FIRST INSTALLATIONS

Nevertheless, the hazard still exists; so much so, that ammonia is entirely unsuitable for installations where safety is the first consideration, such as on shipboard, in theaters, hospitals, prisons, hotels, office buildings, schools, or institutions in which the occupants are helpless or restrained or where mass hysteria could result in mob frenzy and panic.

For such applications, in which safety is paramount, some other refrigerant had to be used, even though its properties other than safety, were quite unfavorable. In the early days of mechanical refrigeration, there were only three available refrigerants that were "safe."

AIR, WATER AS REFRIGERANTS

One was air, and it was used considerably on shipboard. However, it requires large, rather cumbersome, expensive, and not very efficient equipment employing what was then known as the "dense air" system and now more often referred to as the "air-cycle."

Another refrigerant was water. Its most obvious limitation is that it is unusable for the temperatures commonly employed in refrigeration for food preservation or cold storage, and certainly not for ice making, as the evaporator temperature with water as the refrigerant, must be above 32° F. Moreover, the density of water vapor is so low that large volumes must be pumped and compressed, and the reciprocating compressor would have to be excessive in size and the centrifugal compressor was as yet undeveloped.

CARBON DIOXIDE

The third available refrigerant was carbon dioxide. It satisfied the safety requirements, for it is non-flammable and it is not dangerous to breathe. It will not support life and can be dangerous if there is enough of it in a room to displace the air to such an extent that there is not enough oxygen for the occupants, but the carbon dioxide is not in itself toxic.

Therefore, although carbon dioxide has many unfavorable characteristics, yet it is "safe" from a standpoint of flammability and toxicity. So the

refrigerating equipment used in those applications where safety was essential at all costs, used carbon dioxide.

It has several disadvantages. First, the pressures are very high, so high in fact, that they were often referred to in atmospheres, and the gauges on the installations were commonly calibrated in atmospheres. At standard ton conditions of 86° condensing and 5° evaporator, the condensing pressure is 1,028.3 p.s.i.g. or 70 atmospheres; and the suction pressure is 316.8 p.s.i.g. or 21.6 atmospheres.

Such pressures require extremely heavy construction of all parts of the system. Fortunately, the displacement is low (.96 cu. ft. per minute per ton, compared to 3.46 for ammonia) so the compressor was comparatively small. Even so, it was expensive to build. The stuffing box was quite a problem in order to hold such high pressures.

All other parts had to be very strong and this was in the days when great strength meant great weight, as present-day strong, yet light materials were then unknown. Lines had to be of extra heavy steel pipe, with heavy flanged joints. Condensers and evaporator coils were also of this construction.

The critical pressure of carbon dioxide is 1,054.7 p.s.i.g., corresponding to a condensing temperature of 87.8°, so that cool condensing water had to be available, for the critical pressure is the top limit for the condensing pressure. At or above critical pressure the compressed gas just doesn't condense into a liquid, so the system doesn't function as a refrigerating machine.

Moreover, the horsepower-per-ton for carbon dioxide is very high; 1.83 compared to .98 for ammonia, and exceeded only by air at 2.8 and ethane at 2.2. A high horsepower-per-ton value may be expected of any refrigerant whose critical pressure is so low that it is not much above the condensing pressure that can be obtained with condensing water at ordinary temperatures.

Carbon dioxide, like ammonia, is not oil-soluble and, also like ammonia, in the liquid form is lighter than oil, so settles to the bottom of the receiver, accumulator, evaporator, etc., and must therefore be drawn off manually at intervals.

WORLD WAR I, THE END OF AN ERA

This was about the situation before World War I. The only two commonly used refrigerants were ammonia (in both compression and absorption systems) and carbon dioxide, with a few dense-air machines. Mechanical refrigeration was confined almost entirely to the large installations in ice making and cold-storage plants and breweries.

There were a few butcher shops and other small establishments equipped with mechanical refrigeration, using ammonia or carbon dioxide. There were a few installations using

sulphur dioxide, made and installed by some of the early pioneers of low-pressure systems, but these were extremely few and of rather experimental character. More will be said of this phase later.

Most of the larger installations were powered by steam engines, often direct connected. Compressors were mostly open crankcase with cross-head construction; many were horizontal, and double-acting compressors were not uncommon. Compressor speeds were very low, 150 r.p.m. being considered "high speed."

There was very little automatic control, even in the small installations in butcher shops, etc. They were started and stopped manually and most of the expansion valves were manually operated.

(To Be Continued)

Rudd Joins Davidson Furniture

OMAHA, Neb.—Bert Rudd, former Nash-Kelvinator representative for Nebraska, has been named appliance department manager and buyer at Davidson Furniture Co. here.

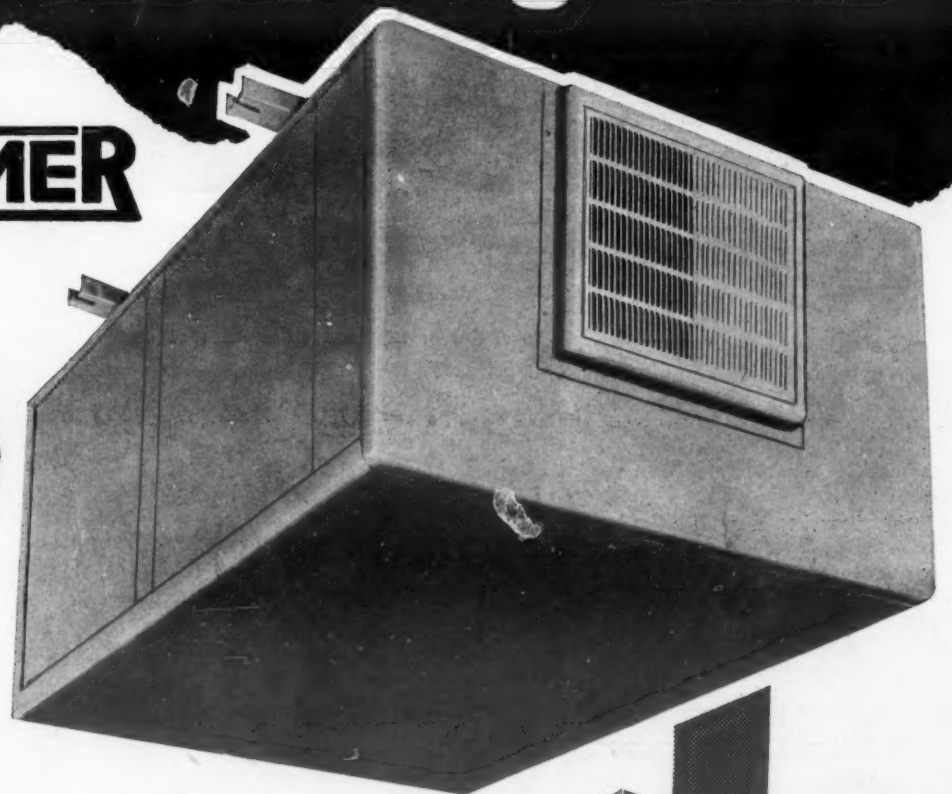
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Means a tremendous saving in valuable floor space—attached to the ceiling, out of the way. Sturdily constructed and efficiently designed to make all parts easily accessible. Hot water or steam coils and humidifier can be furnished to make it readily adaptable for year-round use. Used with or without ducting. Available in three to ten ton capacity. Here is an air conditioning unit that offers more to you and your customers.

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WRITE FOR BULLETIN AC-171

KRAMER TRENTON CO. Trenton 5, N. J.

THEMOBANK - COOLMASTER - RADIAL UNITS - PANEL UNITS - CUBERS - FINNED COILS - BARE TUBE COILS - HEAT INTERCHANGERS - CONDENSERS Air Cooled, Water Cooled, Evaporative - WATER COOLING EVAPORATORS - BLAST COOLING COILS - BLAST HEATING COILS.

With Exhibits, Speakers

Cleveland Distributor Holds Own 'Air Conditioning Show'



Paul H. Dow, sales manager, Temperature Equipment Corp.; John D. Hayes, Fedders-Quigan Co. (Buffalo); James LaSalvia, chief engineer, Osborn Engineering Co. (Cleveland); and Frank deRoberts, Fedders' regional service manager discuss prospects for 1949 sales of Fedders' new console air conditioners.



William Neiheiser, chief engineer, Temperature Equipment Corp., explains the fine points of the Chrysler Airtemp radial compressor to V. C. Dee, engineer for Gorman-Lavelle Plumbing & Heating Co. (Cleveland), as Paul H. Dow, sales manager of Temperature Equipment Corp., looks on.

CLEVELAND—More than 800 visitors from the trade and associated professions of Greater Cleveland attended the "Cleveland Air Conditioning Show" held here the week of March 28 at the headquarters of Temperature Equipment Corp.

The week long promotion, which corresponded with the corporation's second anniversary, was held to acquaint dealers and their salesmen with the products and engineering aid available from the distributorship. Guest speakers, representing various segments of the industry were featured at the Show.

Products introduced at the Show included the Fedders console air conditioner and the new Airtemp 60,000 B.t.u. capacity gas winter air conditioner.

Tuesday was reserved as A. I. A. and Professional Engineer's Day, according to Paul H. Dow, sales manager of the company, and considerable local publicity resulted.

Guest speakers included R. D. Tuttle, chief engineer, Tuttle & Bailey Co., New Britain, Conn., who spoke on "Air Distribution Through the Use of Grilles, Regulators, Diffusers, and Convectors," and L. S. Redford, vice president and general manager of Jackson & Church, Saginaw, Mich. furnace manufacturer.

On Wednesday evening the new Fedders console room cooler was presented by John D. Hayes, regional manager, and Frank deRoberts, regional service manager, both of the Fedders-Quigan organization.

Thursday evening A. F. Ward of Chrysler Airtemp spoke on selling packaged air conditioning and following the talk, M. T. Bard, national accounts manager of Airtemp told dealers how to tie in with national accounts sales to obtain profitable business.

In the closing evening W. B. Shirley, Airtemp heating manager, presented the new Airtemp 60,000 B.t.u. gas furnace, and T. B. Hollen-camp, Airtemp service manager, discussed heating service problems.

Dow, who served as chairman of the several evening meetings, stated that Carl W. Millsom, vice president of Temperature Equipment Corp. reported that the firm's management was pleased with the success of the first "Cleveland Air Conditioning Show."

"We are attempting to build a new type of distributorship," Millsom said, "in which engineering service, assistance in estimating, and consultation on sales policy is of real benefit to our dealer organization. The interest of our dealers in the recent Show indicates that we are on the right road and that our policy will be successful."

G-E Reduces Output on Wringer-Type Washer

BRIDGEPORT Conn.—A production cut of approximately 50% in wringer-type clothes washers was made by the General Electric Co. recently because this type of washer "isn't moving now."

"Many small manufacturers of conventional washers are liquidating inventories and these machines are retailing at prices we can't compete with," a company official explained.

Appliance Group Asks 90-Day Price Guarantee

NEW YORK CITY—The Bronx Radio and Appliance Dealers' Association went on record here recently as demanding 90-day price guarantees on all appliance and radio merchandise, and recommending that the New York City Metropolitan Council of Appliance Dealers press for immediate action on a citywide basis.

The group asserted that recent price reductions by manufacturers, especially when they came without warning or rebates to the dealer, were having a serious effect on their businesses.

Members declared that they could not indefinitely sustain this devaluation of their inventories.

Mumm's Appliance Chartered

BUFFALO—Mumm's Appliance Corp. has been incorporated here with capital of \$25,000. Incorporators are Frederick J. Mumm, John F. Mumm, and Ellen E. Mumm.

Florida Court Kills Bill Permitting Mfr. To Force 'Contract' Price on All Dealers

TALLAHASSEE, Fla.—By a vote of 6 to 1, with Chief Justice Alto Adams writing the majority opinion, the Florida Supreme Court on April 5 killed a 1939 fair trades law under which a manufacturer was authorized to enter a contract with one retailer on a minimum price for a trade-mark product and enforce that price upon all other retailers.

The high tribunal, in effect, held the law was against the public interest and welfare, created a monopoly, stifled competition, and was an excessive use of police power.

Chief Justice Adams wrote: "Our conclusion is that the act is arbitrary and unreasonable and violates the right to own and enjoy property; one economic group must not have

the sovereign power of the State extended to it and use it to the detriment of other citizens.

"In that case the legislature serves a private rather than a public purpose. The sovereign power must not be delegated to a private citizen to be used for a private purpose and especially where there is no State supervision."

A 15-day period in which businessmen could appeal the court's decision was declared and R. Q. Richards, secretary-manager of the Florida State Pharmaceutical Association, said that his group is drafting a motion for a rehearing.

Richards pointed out that the law was still in effect until the 15-day period expired.

Past Due Accounts Increasing, Survey Shows

CHICAGO—An increase in past due accounts and an increase in the average age of accounts was noted in a survey of local retailer, wholesaler-distributor, and manufacturer accounts for February as compared with the same month last year.

The survey was conducted by the Chicago Association of Credit Men

and covered more than 300,000 active accounts, according to A. L. Jones, president.

Fewer wholesale and retail buyers were paying when due and a larger number were discounting bills, the survey also revealed. The opposite was true with industrial accounts.

This is the way the credit picture looked to the association:

| | Retail | | Wholesale | | Industrial | |
|--------------------------------------|--------|------|-----------|------|------------|------|
| | 2/49 | 2/48 | 2/49 | 2/48 | 2/49 | 2/48 |
| Per cent of buyers discounting bills | 63.8 | 55.8 | 61.9 | 56.6 | 46.7 | 51.2 |
| Per cent of buyers paying when due | 27.2 | 36.1 | 29.9 | 35.7 | 42.3 | 39.2 |
| Per cent of past due accounts.... | 9.0 | 8.1 | 8.2 | 7.7 | 11.0 | 9.0 |
| Average age of accounts (days).... | 28.6 | 25.2 | 26.7 | 26.3 | 28.0 | 27.4 |

Check these 3 construction features



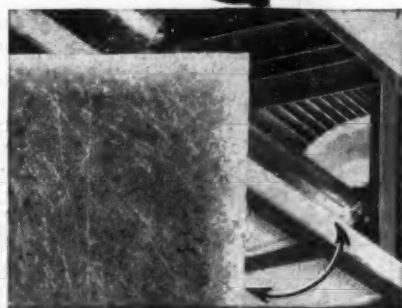
New EVAPORATIVE CONDENSERS

BUSH LEADS AGAIN with this new line of Evaporative Condensers in 5 to 40 ton capacities. The Bush label is, as always, your guarantee of sound engineering principles, expert design, superior construction and finest materials. Welded steel angle iron and heavy gauge steel for the frame and sump are hot-dipped galvanized after fabrication. Inside surfaces are covered with bitumastic compound to prevent corrosion and insure long lasting peak performance. For easy installation large units are built in sections that will move through standard doorways. Access doors are easily removable for the servicing and cleaning of all parts.

Send for the new Bush Evaporative Condenser Data Book today!



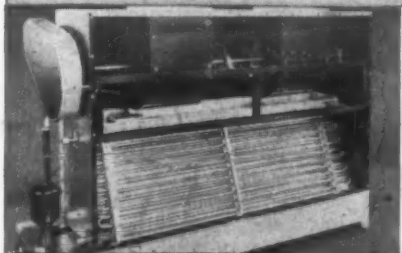
BUSH MANUFACTURING CO. • WEST HARTFORD, CONN.



FIBREGLASS ELIMINATOR Sections are used in the 20 to 40 ton units for positive elimination of entrained water droplets to prevent corrosion in fan section. Access door for easy cleaning and inspection.



CENTRIFUGAL PUMPS with integral vertically mounted motors on 5 to 15 ton units. Inlet at bottom of sump to avoid air binding. Bleed lines on outlet — bleed occurs only in operation. Pump, float valve and strainer are easily accessible for service.



CONTINUOUS TUBING eliminates return bends. Hot-dipped galvanized steel spacers reinforce the coil. Entire assembly completely tested at 300 lb. pressure. Coils can be split into separate circuits when desired.

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